K-12 Coastal Wetland Teacher Needs Assessment

prepared by

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INTRODUCTION

As part of a national effort guided and coordinated by the National Estuarine Research Reserve System (NERRS), in Fall 2014, Tijuana River National Estuarine Research Reserve (TRNERR) with assistance from an external evaluator, Leanne Jacobson, conducted a K-12 Coastal Wetland Teacher Needs Assessment. The needs assessment is designed to capture estuarine related topics and materials that educators will utilize and incorporate into their yearly curriculum. Combined with responses from like needs assessments conducted by NERRS throughout the country, results will shed light on work that can be shared throughout NERRS. This report presents the findings from the TRNERR needs assessment survey.

Purpose

TRNERR has been providing services to the San Diego County area along with Tijuana, Mexico for many years. Much of these services are used by school teachers to enhance lessons, impact student understanding and expose students to different ways of learning. To hone TRNERR services, a needs assessment was planned. The results of the needs assessment can offer TRNERR providers with clarity on the topics and materials that educators are interested in using, in turn, allowing for TRNERR to align their services with educators' interests and curriculum.

Method

In 2011 the National Estuarine Research Reserve System (NERRS) put together a set of estuarine-related questions that would offer insight into topics that would be of greatest interest to NERRS patrons. Having a number of possible topics but limited resources, a needs assessment would identify the topics that NERRS as whole, as well as each NERR itself, could focus their efforts on. Each NERR was given a set of agreed upon questions to use as the core of their site's needs assessment. Additionally, each NERR could include additional questions that would be included only in that site's needs assessment.

The final TRNERR needs assessment consists of 31 questions. The core set of questions developed by NERRS are used along with three additional questions created by a team of San Diego County coastal environmental educators. All responses would be anonymous and confidential. As an incentive, respondents would be given the option to partake in an opportunity drawing.

San Diego County is the second-most populous county in California and the fifth-most populous county in the United States. Based on 2010 census data, there are more than 3 million residents in San Diego County. Because of the size, as well as the educational nature of the questions in the needs assessment, the needs assessment was targeted at educators. There are 42 school districts within San Diego County along with a number of schools operated by the San Diego County Office of Education as well as private schools. There are eight watersheds within the county. To pinpoint which educators would be most likely to be interested in estuarine-related educational tools, a map of the 9 watersheds located in San Diego County was overlaid onto a map of all the San Diego County school districts. Of the 42 school districts, 29 districts are

located within a watershed boundary. Educators within each of these 29 districts became the target population for the TRNERR needs assessment.

With the target population chosen, the next step was to invite the districts to participate in the needs assessment. Surveying teachers requires district approval. Gaining district approval was, thus, the first step. Understanding that an established relationship gains access to district personnel more easily, TRNERR colleagues, also environmental educators, volunteered their time and efforts by introducing the evaluation team with any district contact they have. Through these introductory emails and follow-up communications, district contacts shared that district's policy and procedures to survey teachers. For those districts where a contact was not established, an email followed by a phone call was sent to a district administrator by the evaluation team. For each district, the goal was to gain permission to distribute the needs assessment to all teachers within that district.

District participation meant that 1) when necessary the survey would be assessed to make sure that it passed the policies and procedures set forth by the district to survey teachers within their district and 2) in order to assure anonymity, a district staff member would be responsible for sending out the survey via email to all teachers over a period of several weeks. The email explained the purpose of the survey as well as the fact that it was voluntary and that the district supported the completion of the survey.

Moreover, because the Tijuana River watershed is located in both the United States and Mexico and because TRNERR has an established relationship with educators in Mexico, educators in Tijuana were invited to participate in the needs assessment as well. Hard copy surveys in Tijuana were conducted in elementary and junior high schools located along to Los Laureles Canyon, in the Delegacion Playas de Tijuana and the Delegacion San Antonio de los Buenos (Delegacion is a municipal district). Once we obtained authorization from the Institute for Educational and Pedagogical Services of Baja California, we visited the schools one by one, asking to the Principal his/her permission to give the surveys to the teachers. When they agreed, teachers filled them out on the spot and other occasions we left the surveys and picked them up days after.

As stated the survey was voluntary, anonymous and confidential and that they were given the option to be entered into an opportunity drawing. Because the needs assessment was anonymous, those who entered the opportunity drawing were asked to share their email address in case they were one of the participants who won the drawing. The survey was distributed via a survey link except in Tijuana, Mexico where paper copies of the survey were distributed.

RESULTS

Sample

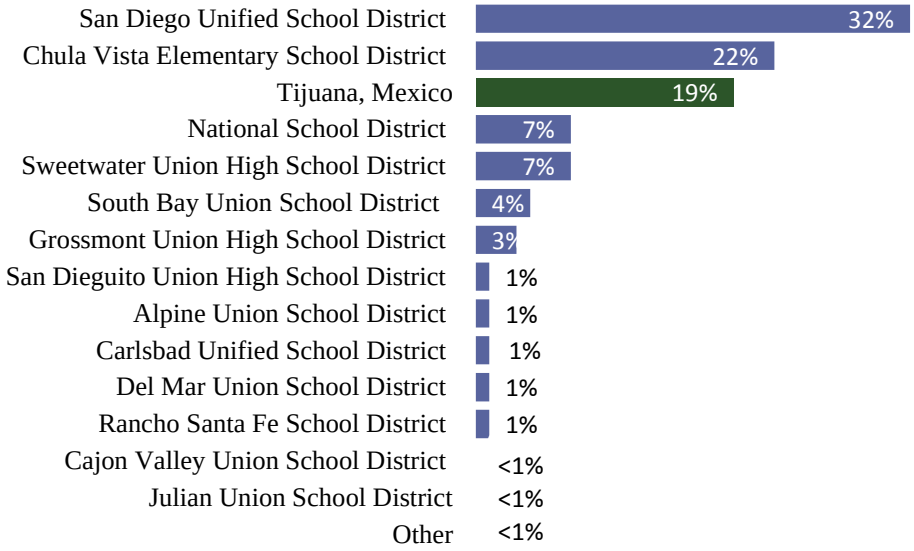
Twenty-nine districts were invited to participate in the needs assessment. In the end, thirteen districts agreed to participate. Additionally, two districts responded to the initial request; however, did not follow-through on subsequent correspondence. Seven districts declined the

invitation to participate. There were seven districts that the evaluation team was unable to successfully gain contact with.

In the end, 555 educators from 13 districts in San Diego County, educators in Tijuana, Mexico and informal educators completed the survey. Separate analyses were conducted for educators from U.S. and the educators from Mexico due to all of the possible differences between educators from the two countries. Thus, a total of 439 educators made up the San Diego County sample- referred to throughout this report as the U.S. sample, and 102 educators made up the Tijuana, Mexico sample- referred to in this report as the Mexico sample. Fourteen respondents did not specify where they taught; these educators are not included in the analyses. Of the 541 educators that did specify where they taught, 80% teach in the U.S. while 20% teach in Mexico.

Percentage of Survey Respondents by Country

Percentage of Survey Respondents by Area or District



To assess differences between districts and/or differences between school levels, district-level analyses and/or school level analyses were conducted. To conduct district-level analyses, districts with at least 20 teachers who completed the survey, were included in the district-level analyses. Five of the districts had more than 20 teachers complete the survey. These districts are Chula Vista Elementary School District, National Union School District, San Diego Unified School District, Sweetwater Union High School District and South Bay Union School District.

When statistically possible, additional analyses were conducted to assess significant differences between districts. Because these districts serve different grades, district-level analyses may be complicated by whom they serve (i.e. primary, middle and/or secondary). Three districts are elementary school districts (Chula Vista Elementary School District, National Union School District and South Bay Union School District); one district is a middle and high school district only (Sweetwater Union High School District) and one district serves all school levels (San Diego Unified School District). Four of the districts are located in the southwest corner of San Diego County while the last is located throughout much of the city of San Diego which is in the center of San Diego County.

School Level Serve by Districts

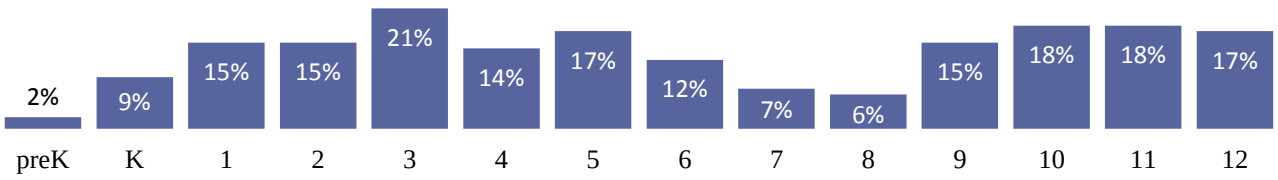
	Elementary	Middle	High School
Chula Vista Elementary School District	**X**		
National School District	**X**		
San Diego Unified School District	**X**	**X**	**X**
South Bay Union School District	**X**		
Sweetwater Union High School District		**X**	**X**

Needs Assessment Responses

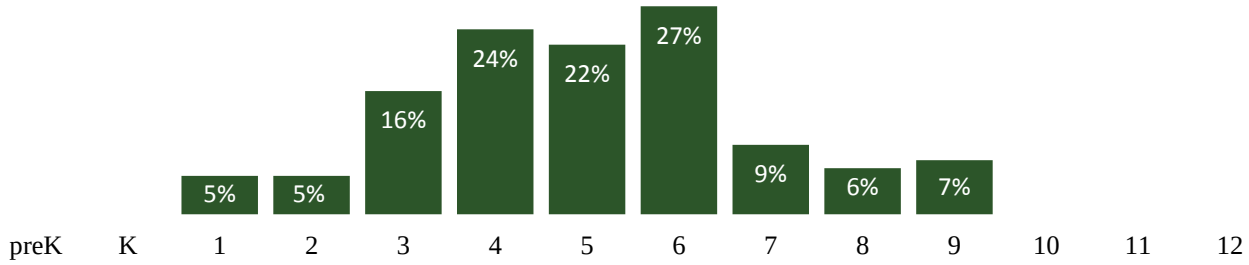
2. What grade do you teach? (Check all that apply)

Of the 555 educators who participated in the survey, 546 were teachers. All grade levels (K-12), including pre-K, were represented. Some respondents taught more than one grade. Seven individuals identified themselves as "other", which was less than 1% of the survey respondents. These individuals referred to themselves as informal educators or administrators.

U.S. Percentage of Survey Respondents by Grade Taught



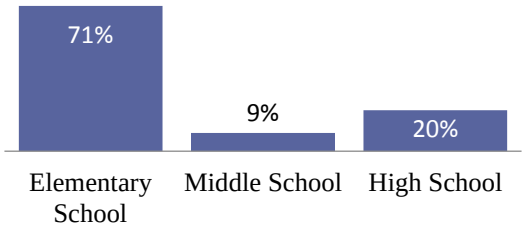
Mexico Percentage of Survey Respondents by Grade Taught



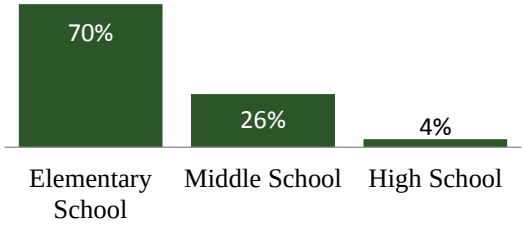
Teachers were also grouped by the level of school they taught in (i.e. elementary, middle or high school). The majority of respondents were elementary school teachers (71%), followed by high school teachers (20%), then middle school (9%).

Comparing the U.S. and Mexico samples, like proportions of each sample are from elementary level schools (71% and 70%, respectively). The sample from Mexico has a greater proportion of middle school teachers than the U.S. sample. No teachers at high schools in Mexico were sampled, however, maybe a few of the middle school teachers also taught high school students elsewhere.

Percentage of U.S. Teachers by School Level



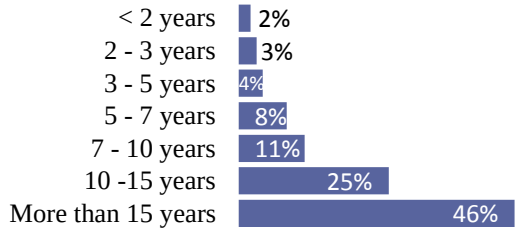
Percentage of Mexico Teachers by School Level



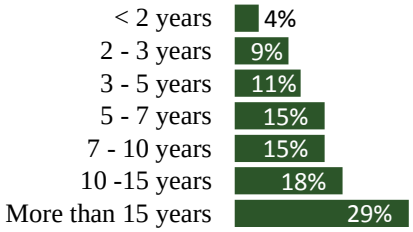
3. How many years have you been teaching?

The majority of teachers have been teaching for at least 10 years (71%). Nearly half of the U.S. sample (46%) has been teaching for more than 15 years while nearly half of teachers in Mexico have been teaching for ten or more years (47%). One-quarter of the teachers in the U.S. sample has been teaching for 10-15 years whereas nearly one-third (30%) of the Mexico sample have been teaching between five to ten years. New teachers are the least represented in both samples.

U.S. Percentage of Teachers by Number of Years Teaching



Mexico Percentage of Teachers by Number of Years Teaching



4. There is a National Estuarine Research Reserve (NERR) located in San Diego County called the Tijuana River National Estuarine Research Reserve, which is one of 28 Reserves around the country protected for the purposes of education, research, water-quality monitoring and coastal stewardship. Were you aware that your state has a NERR?

About half of respondents (52%) are aware of the Tijuana River National Estuarine Research Reserve. Further analyses revealed that teachers working in the South Bay Union School District and Sweetwater Union High School District are more aware of TRNERR than teachers from other districts. Teachers from all school levels are similarly aware of TRNERR.

U.S. Teachers Awareness of TRNERR by District

Only a small number of Mexico educators are aware of TRNERR.

Awareness of TRNERR for Mexico Teachers

5. Have you ever used any of the educational services or products offered by the Tijuana River National Estuarine Research Reserve?

One-quarter (25%) of educators from the U.S. sample have used an educational service or product from TRNERR. The majority (75%), however, have not used any TRNERR service or product.

Percentage of U.S. Teachers Who Used TRNERR Materials

For Mexico teachers, only 4% have used a TRNERR educational service.

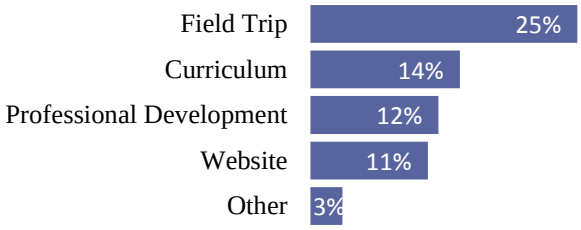
Percentage of Mexico Teachers Who Used TRNERR Materials

6. What services have you used?

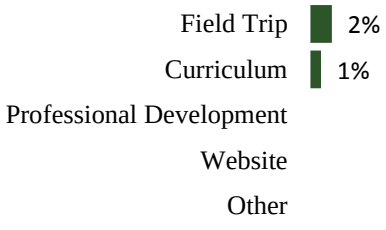
For those that have used a service or product, field trips were the most common service used followed by professional development from TRNERR and the TRNERR website. A small proportion has used "other" services. "Other" services included trips with family, presenter in the classroom and attendance related to other work. Teachers working in the South Bay Union School District used the TRNERR services more often than teachers in the other districts.

Two teachers working in Mexico have used a TRNERR service. One had taken a TRNERR field trip while the other uses the TRNERR website.

Percentage of U.S. Teachers who Use TRNERR Services



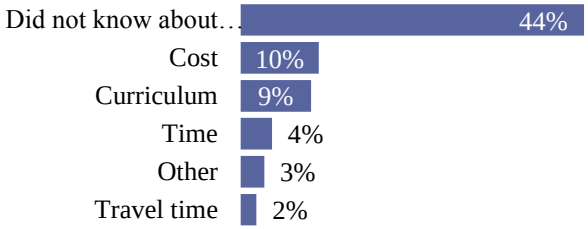
Percentage of Mexico Teachers who Use TRNERR Service



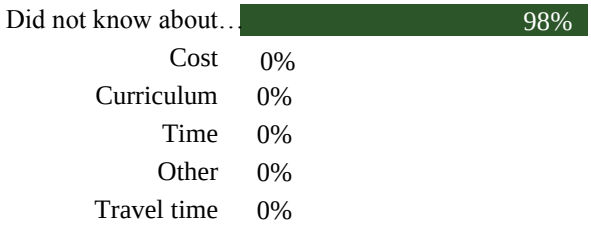
7. Why haven't you used any services or products?

For those who said that they haven't used the products, the most common response was that they didn't know about the products or services that TRNERR offered. For those who gave a reason for not using a TRNERR service the most common reason is the cost of the field trip – in particular the cost of the buses to get students to the event is the most common barrier. The other most common reasons were that teachers didn't feel it aligned with their curriculum (9%) or that they didn't know how to connect it to their curriculum. Responses did not vary between school levels or by district. Almost all of Mexico teachers didn't know about TRNERR.

U.S. Teachers' Reasons for Not Using TRNERR Services



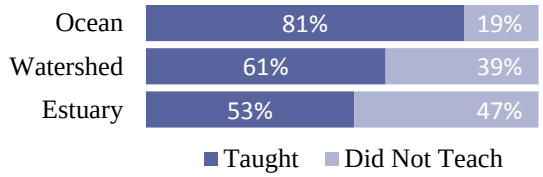
Mexico Teachers' Reasons for not Using TRNERR Services



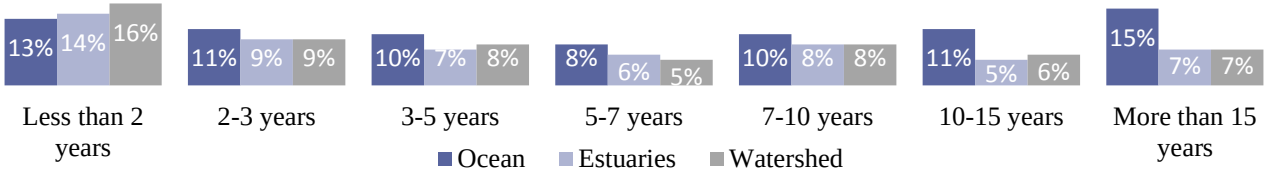
Question 8. How many years have you been teaching estuary, watershed and ocean related topics?

Overall, the teachers in the U.S. sample are more likely to teach about the ocean than about estuaries or watersheds. Specifically, 81% of teachers stated that they teach about ocean related topics compared to those who teach about estuary and watershed (53% and 61%, respectively). For those that do teach any of these topics, the length of time teaching the topic varies from less than 2 years to more than 15 years. There were no differences between districts or between school levels.

Percentage of U.S. Teachers Who Teach Ocean, Watershed & Estuary Lessons

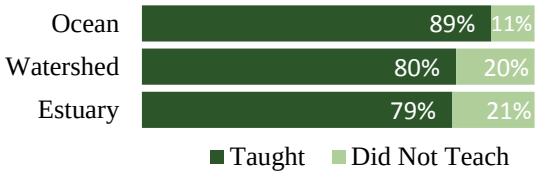


Length of Time U.S. Teachers have been Teaching Ocean, Watershed & Estuary Lessons

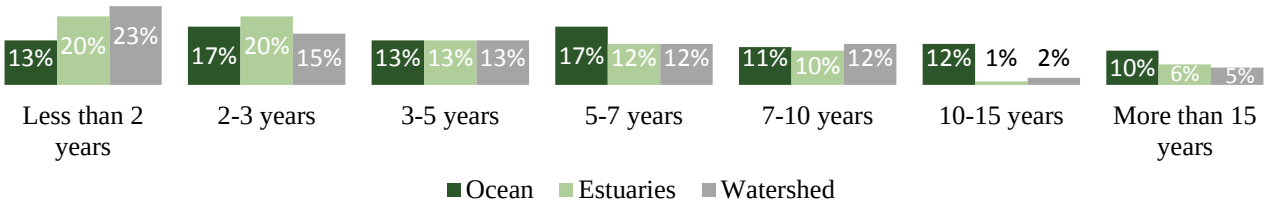


Over three-quarters of teachers in Mexico are teaching topics about the ocean, watershed and estuary (89%, 80%, 79%, respectively). Length of time teaching these topics varies from less than two years to more than 15 years.

Percentage of Mexico Teachers Who Teach Ocean, Watershed & Estuary Lessons



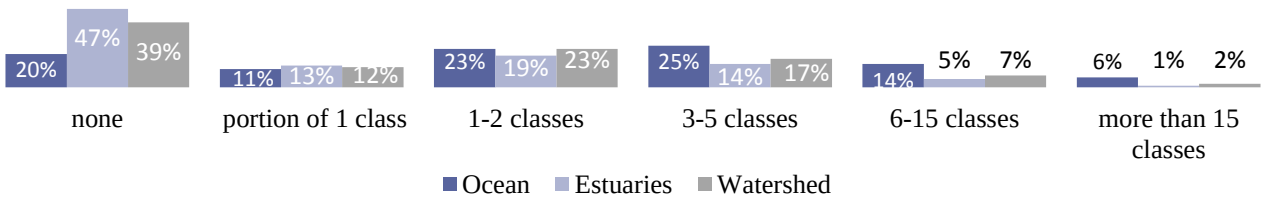
Length of Time Teaching Ocean, Watershed & Estuary Lessons for Mexico Teachers



Question 9. How many class or activity periods of estuary, watershed, and/or ocean instruction do your students receive in a typical school year?

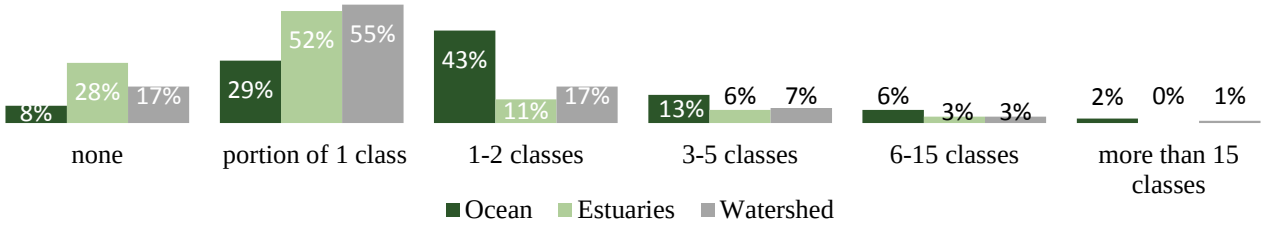
According to U.S. survey respondents, the amount of instruction that students receive on any of these topics varies. Instruction on estuaries is least likely to occur followed by watersheds and oceans (18%, 35% and 44%, respectively). For those students that are receiving instruction on oceans and watersheds, the most common amount of time spent on this topic is between 1-2 full class periods (27% and 22%, respectively). A portion of one class is the most common amount of time spent on teaching about estuaries. South Bay Union School District teachers spend more time teaching about oceans than teachers in the other districts. Elementary, middle and high school teachers spend similar amounts of time on these topics.

Class Time Devoted to Ocean, Watershed and Estuary Lessons by U.S. Teachers



It is most common for teachers from the Mexico sample to spend at least a portion of a class on estuaries and watersheds. Teaching about the ocean takes up, on average, between one to two class periods for teachers.

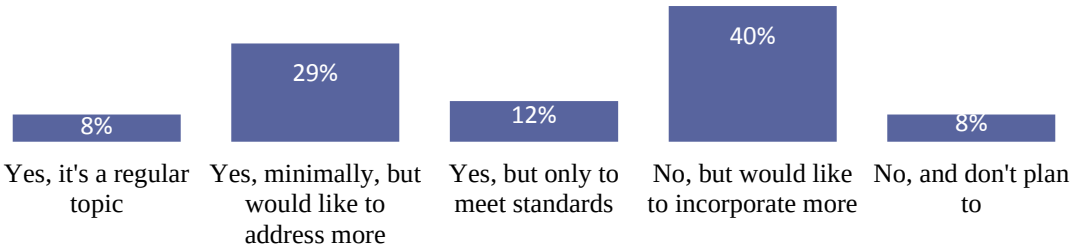
Class Time Devoted to Ocean, Watershed and Estuary Lessons by Mexico Teachers



Question 10: Do you incorporate lessons or discussion related to estuary and estuary-related topics into your curriculum for the year?

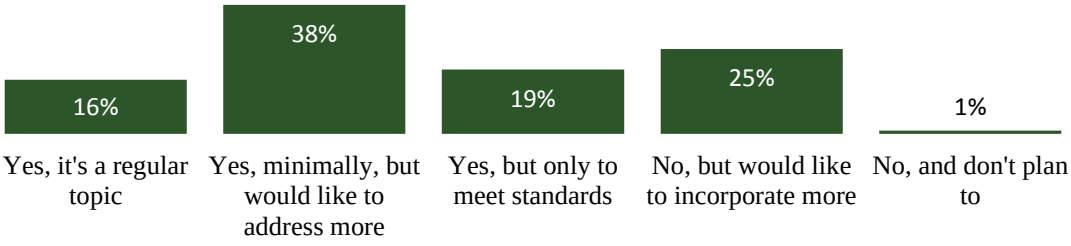
Approximately half (52%) of U.S. survey respondents incorporate estuary and/or estuary-related topics into their curriculum. The majority of teachers (69%) would like to incorporate it more into their lessons. This trend is the same across school levels and districts.

U.S. Teachers Current Year's Estuary Lessons



The majority of teachers (73%) in the Mexico sample include estuary and/or estuary-related topics into their curriculum. Moreover, almost all (98%) of the teachers that don't teach about estuaries, would like to incorporate it into their curriculum.

Mexico Teachers Current Year's Estuary Lessons



Question 11. Do you have a need for new educational materials related to estuary, watershed, and/or marine/ocean science in languages other than English?

Half of the U.S. teachers (50%) shared that they would like to have educational materials in a language besides English. The most common request is to translate materials into Spanish (94%). Other suggestions include Arabic, Chinese, Farsi, Hmong, Japanese, Karin, Vietnamese, Somali, Tagolog,

Teachers in Mexico would like educational materials in Spanish.

Question 12. Have you had any training in watershed, estuary or ocean/marine science within the last 3 years?

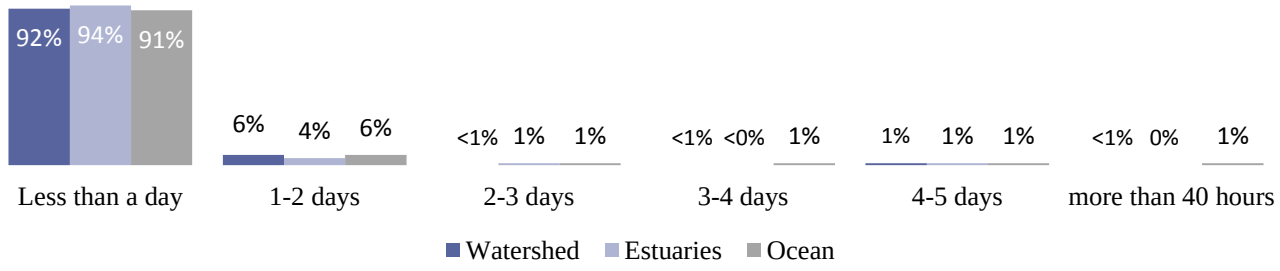
The majority of U.S. teachers (85%) have not received any training on watersheds, estuary or ocean/marine science in the last three years. This did not vary across districts and school level.

All but one educator from the Mexico sample (99%) reported receiving no training in watershed, estuary or ocean/marine science within the last 3 years.

Question 13: In the last three years, how many hours of professional development training in science have you obtained related to estuaries, watersheds and the ocean?

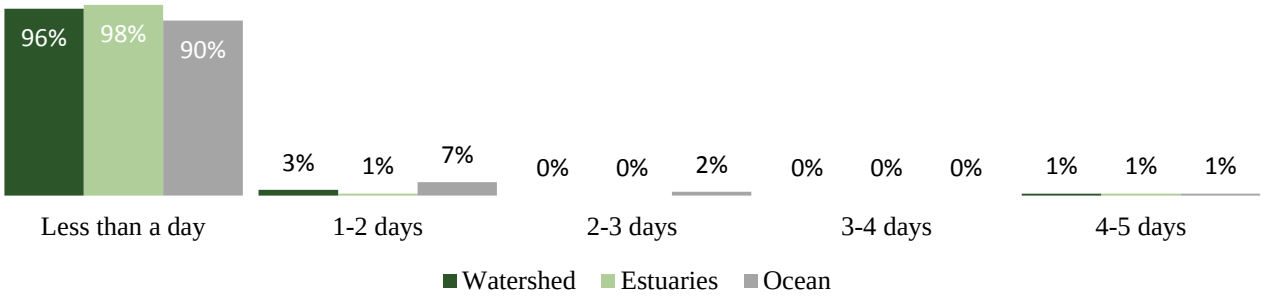
The vast majority of teachers have had little or no training on any of these topics. For those that have had training on this topic, length of training varied from less than a day to more than 40 hours; however, almost all (92%) had less than a whole day's worth of training. High School teachers appear to have somewhat more professional development training than elementary or middle school teachers.

U.S. Teachers Amount of Professional Development



The majority of Mexico teachers have not received professional development. For those that have received professional development, less than a day is the common amount. These results are similar to the results for teachers working in the U.S.

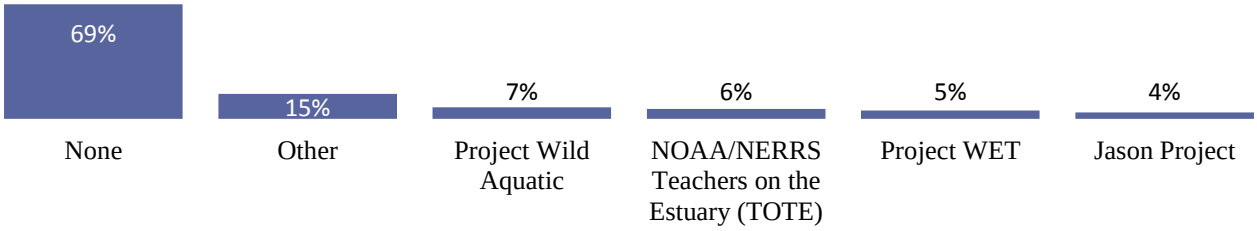
Amount of Professional Development for Mexico Teachers



Question 14. Which professional development trainings have you taken to supplement your estuary/watershed/ocean education?

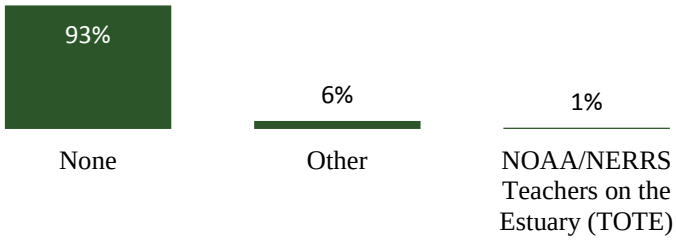
The majority of survey respondents did not take part in professional development trainings for estuary/watershed/ocean education. For those that had a training NOAA/NERRS Teachers on the Estuary (TOTE), Jason Project, Project WET and Project Wild Aquatic are the trainings that they had attended. Other trainings that teachers attended included MARE, Project Swell, Ocean Discoveries, and several others.

U.S. Teachers Supplemental Training on Estuary/Watershed/Ocean Education



Almost all teachers (93%) working in Mexico have not received supplemental training on estuary/watershed/ocean education.

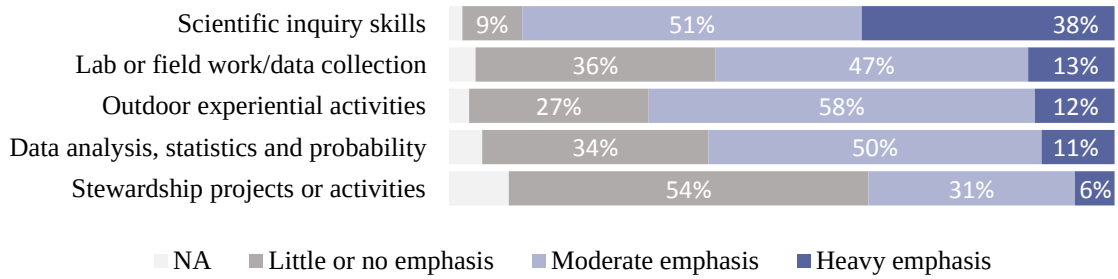
Mexico Teachers Supplemental Training on Estuary/Watershed/Ocean Education



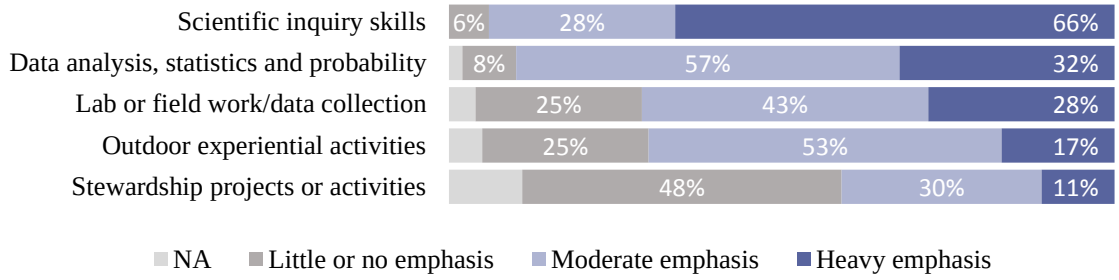
Question 15: Think about your plans for your class for the entire year, how much emphasis did you or will you give each of the following?

Of the five science skills listed, all teachers place the most emphasis on teaching "scientific inquiry skills." Moreover, the focus on "scientific inquiry skills" increases as the school level increases. Emphasis on "data analysis, statistics and probability" as well as "lab or field work/data collection" increases once students enter middle and high school. In contrast, "outdoor experiential activities" is less emphasized in high school. Elementary, middle and high school teachers place the least amount of emphasis on "stewardship projects or activities."

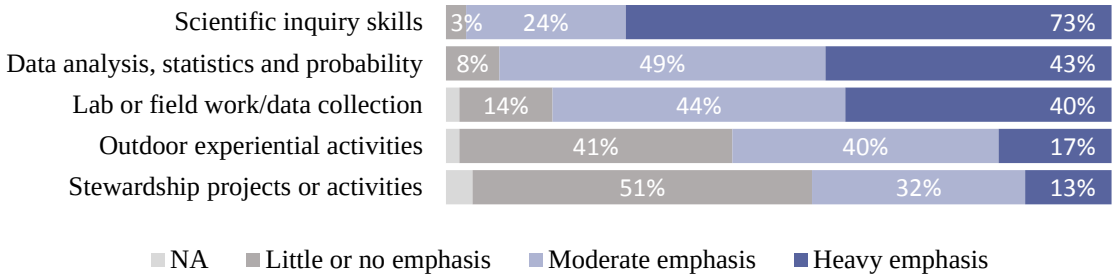
U.S. Elementary School Teachers Emphasis on Science Skills



U.S. Middle School Teachers Emphasis on Science Skills

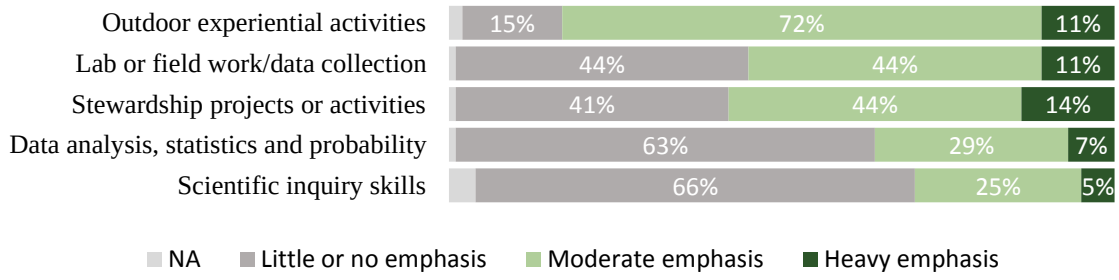


U.S. High School Teachers Emphasis on Science Skills



Teachers from Mexico are more likely to emphasize "outdoor experiential activities" than any other science skill. More than half of teachers placed moderate to heavy emphasis on "stewardship projects or activities" and "lab or field work/data collection." Around one-third of teachers placed moderate to heavy emphasis on "data analysis, statistics and probability" and "scientific inquiry skills" (36% and 30%, respectively).

Mexico Teachers Emphasis on Science Skills

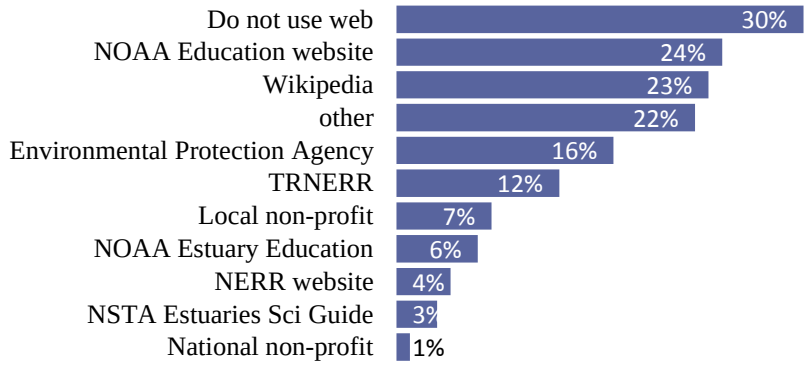


Question 16: From which web resources do you currently obtain estuary, watersheds, and ocean information for use in your classroom? Check all that apply.

Nearly one-third of survey respondents don't currently use web resources to obtain estuary, watershed and/or ocean information. For those who utilize web resources in their classroom, NOAA, Wikipedia and resources not listed are the most common. "Other" web resources

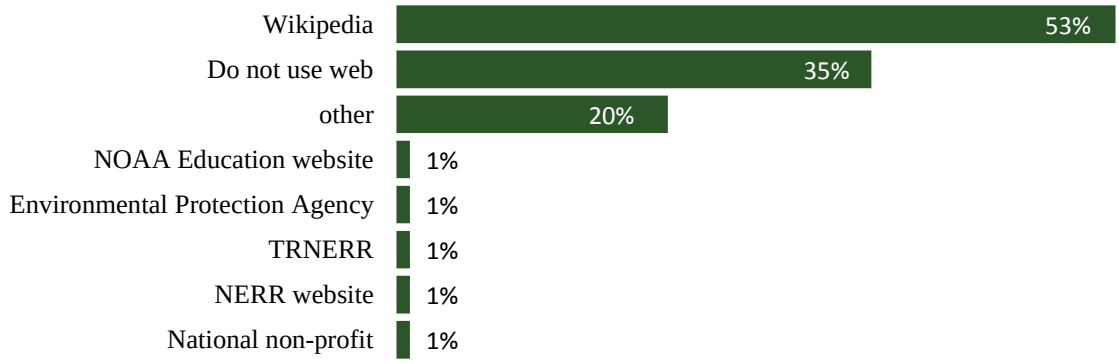
included general "google" searches, Discovery Education website, I Love a Clean San Diego website, and Living Coast Discovery Center website. This did not vary by district or grade level.

U.S. Teachers Use of Web Resources



About half (53%) of survey respondents from the Mexico sample use "Wikipedia" as their web resource. Another third (35%) of teachers do not use the web.

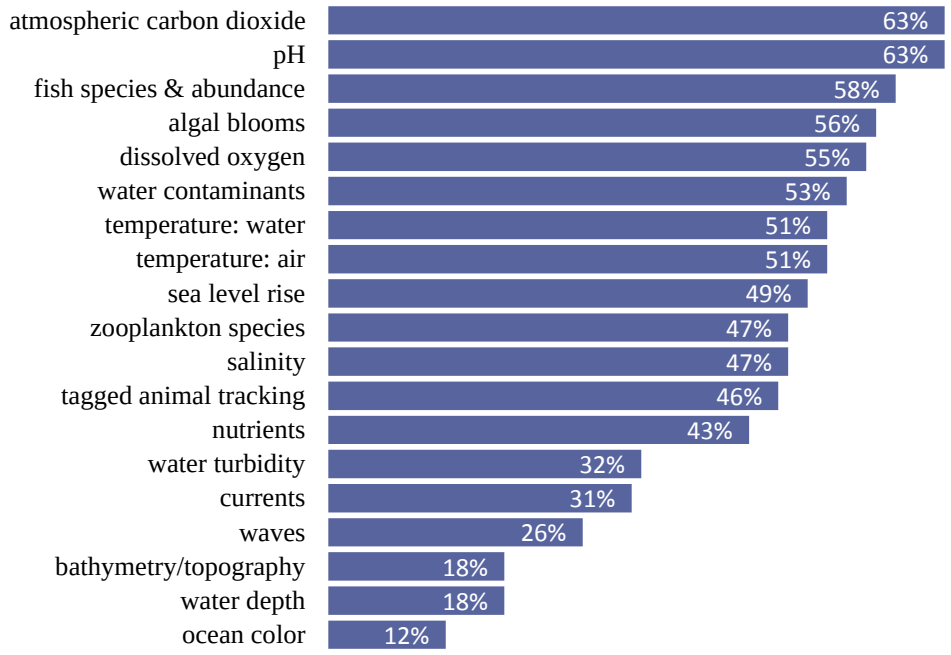
Mexico Teachers Use of Web Resources



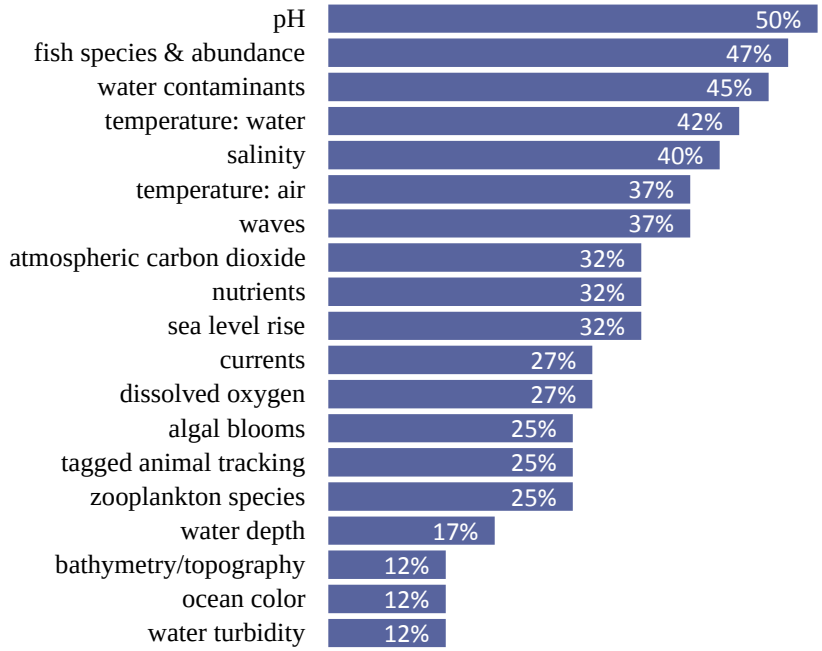
Question 17: Which of the following real-time/archival data sets would you need synthesized into age-appropriate learning materials and visualizations for your teaching?

The vast majority of survey respondents (82%) wanted at least one of the suggested topics synthesized into age-appropriate learning materials and visualizations. The highest rated topics, however, vary by school level. Atmospheric carbon dioxide and pH are the top two real-time/archival data sets that high school teachers want synthesized into age-appropriate learning materials and visualizations for teaching. Six more real-time/archival data sets are of interest to at least half of high school teachers. In contrast, pH is the only topic of interest to at least half of middle school teachers. Four additional topics are of interest to at least 40% of middle school teachers. Elementary teachers, as a whole, are less likely to want real-time data sets synthesized. Temperature appears to be the topic that is of most interest to elementary school teachers.

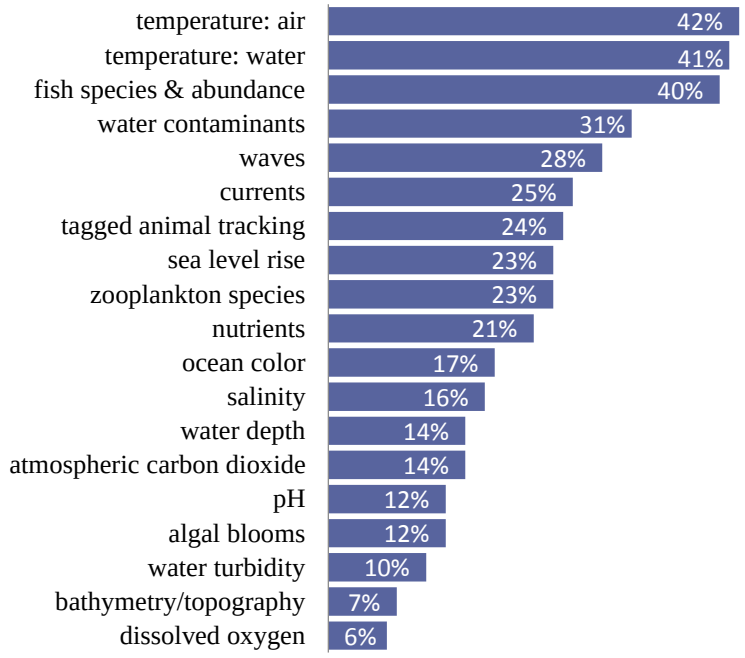
Percentage of U.S. High School Teachers by Data Set



Percentage of U.S. Middle School Teachers by Data Set

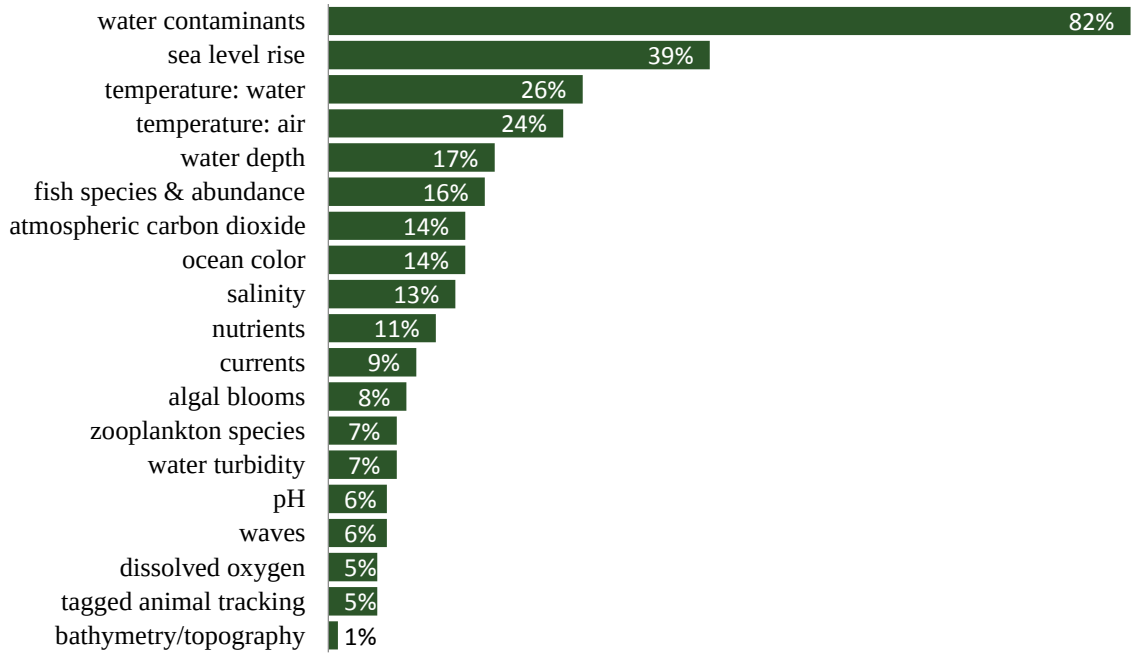


Percentage of U.S. Elementary School Teachers by Data Set



Teachers working in Mexico are by far most interested in having a data set on water contaminants synthesized to into age-appropriate learning materials and visualization to use in their teaching.

Percentage of Mexico Teachers by Data Set

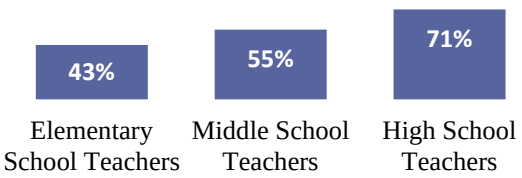


For those that shared that they wanted "other" materials developed into learning materials suggested topics are birds that visit estuary, food web, native plant species and abundance, ocean habitat, phosphates, nitrates, plate movement / volcanic and earthquake, tidal cycle, water testing and what it means to the aquatic life as well as weather.

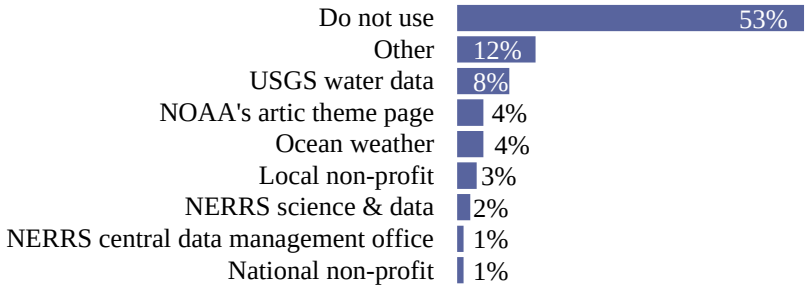
Question 18. If you use real-time/archived science data, please check any of the following data sources that you've used.

First, based on survey responses, the use of real-time/archival science data increases after elementary school and continues to increase into high school. For those that do use science data the "other" category was the most commonly checked. Sites used include NASA, SIO, Foss and MBARI. Of the websites listed less than 10% of survey respondents reported using that data source.

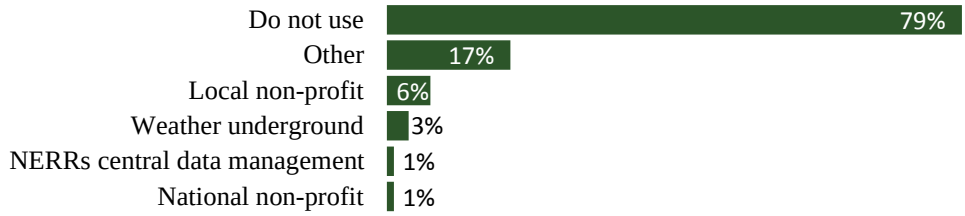
U.S. Teachers Use of Real-Time/Archived Science Data by School Level



U.S. Teachers Use of Real-Time/Archived Science Data



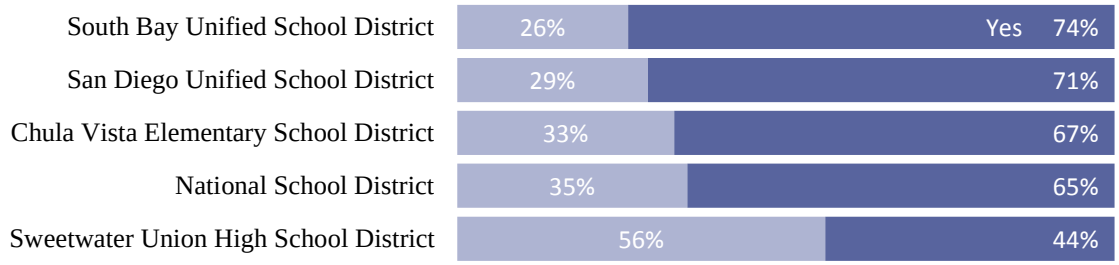
Mexico Teachers Use of Real-Time/Archived Science Data



Question 19: Thinking about the past two school years as well as the current school year, have you incorporated opportunities for outdoor student exploration in your curriculum?

The majority of teachers from all but Sweetwater Union High School District are likely to incorporate opportunities for outdoor student exploration in their curriculum. In contrast, less than half (44%) of Sweetwater Union High School District teachers shared that in the current year as well as the past two school years, they have incorporated opportunities for outdoor student exploration in their curriculum.

U.S. Teachers Use of Outdoor Exploration by District



Approximately three out of five Mexico teachers offer outdoor exploration opportunities as part of this year's curriculum.

Mexico Teachers Use of Outdoor Exploration

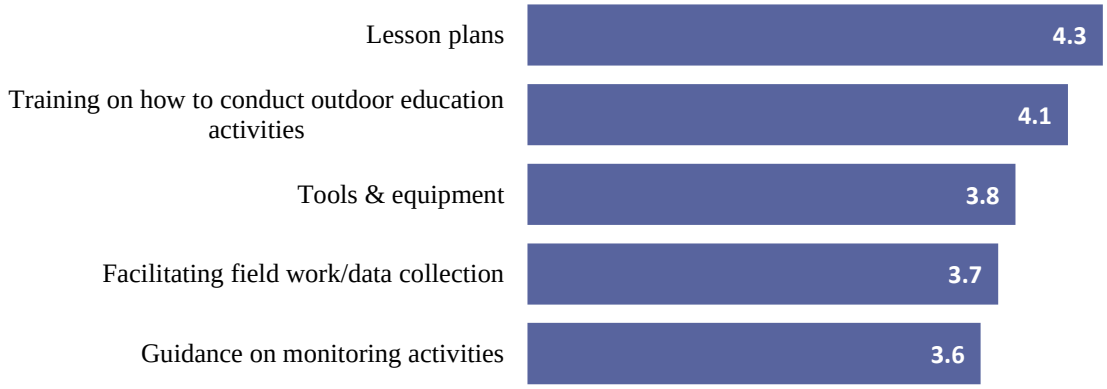
Question 20. What type of activities?

A variety of activities were listed which include 6th grade camp, nature hikes, exploration, observation, local outdoor sites, planting, school garden, etc. A full list of activities is presented in Appendix A.

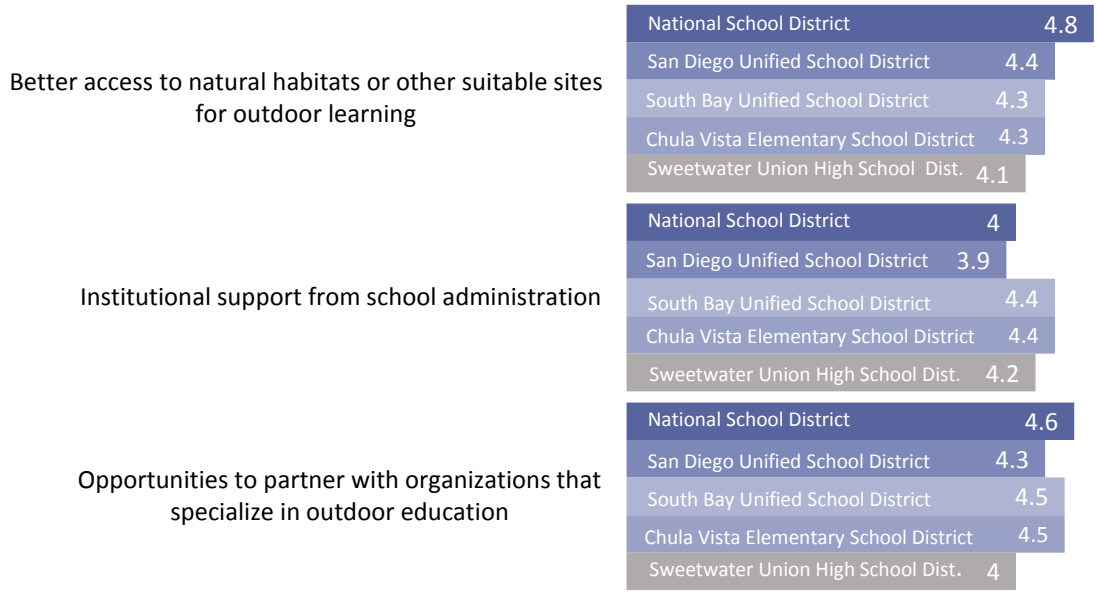
Question 21. To what extent would the following assist you in incorporating more outdoor education into your curriculum?

On average, using a scale of one to five with five being the highest, teachers rated the following materials the highest: "lesson plans," "better access to natural habitats" and "opportunities to partner with organizations that specialize in outdoor education." Also, rated in the highest range, are trainings on how to conduct outdoor education activities and gaining institutional support from school administration. National Union School District was the most interested in gaining "better access to natural habitats or other suitable sites for outdoor learning education." Additionally, high school teachers are, on average, interested in "case studies on scientific field data collection and associated activities for incorporation into curricula." Three materials were significantly different across districts while two materials varied by grade level.

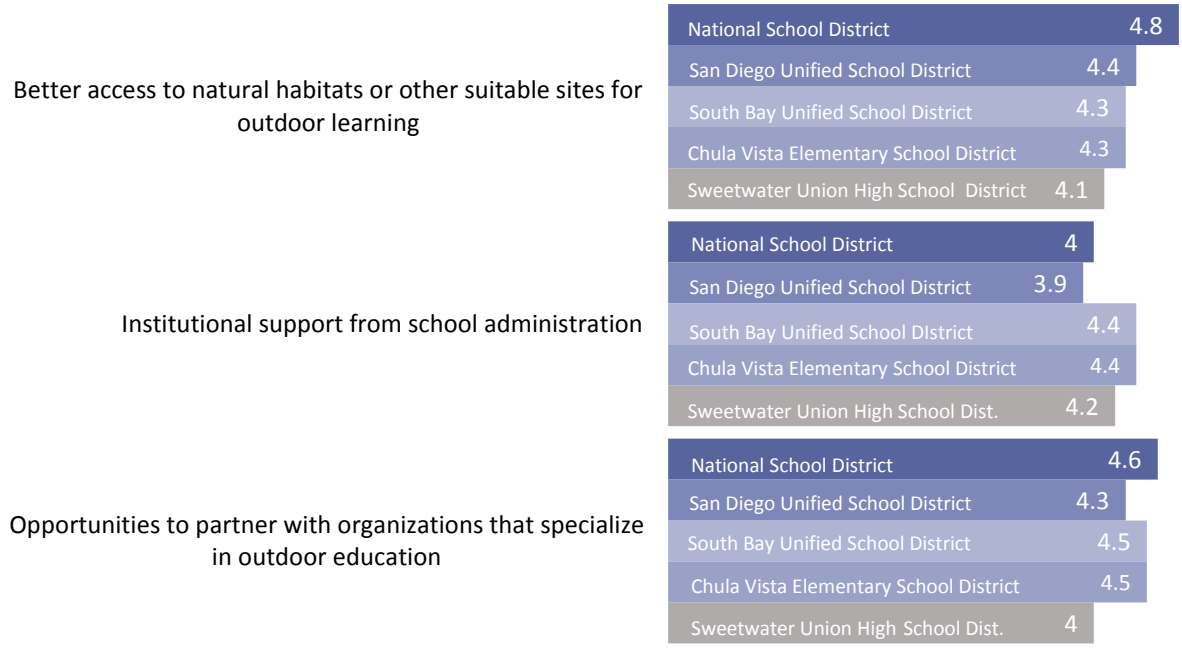
Average U.S. Teacher Ratings of Material Usefulness



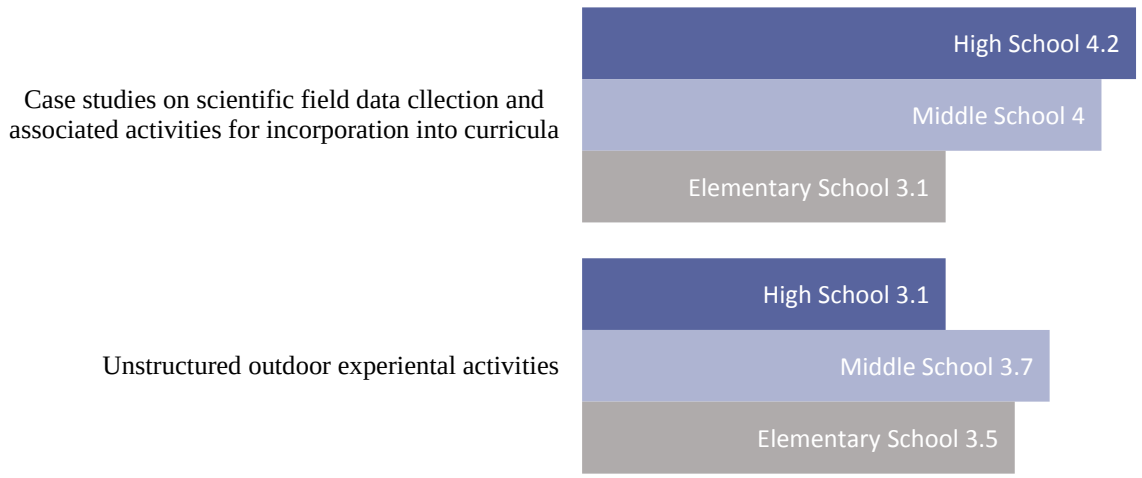
Average U.S. Teacher Ratings of Material Usefulness by District



Average U.S. Teacher Ratings of Material Usefulness by District

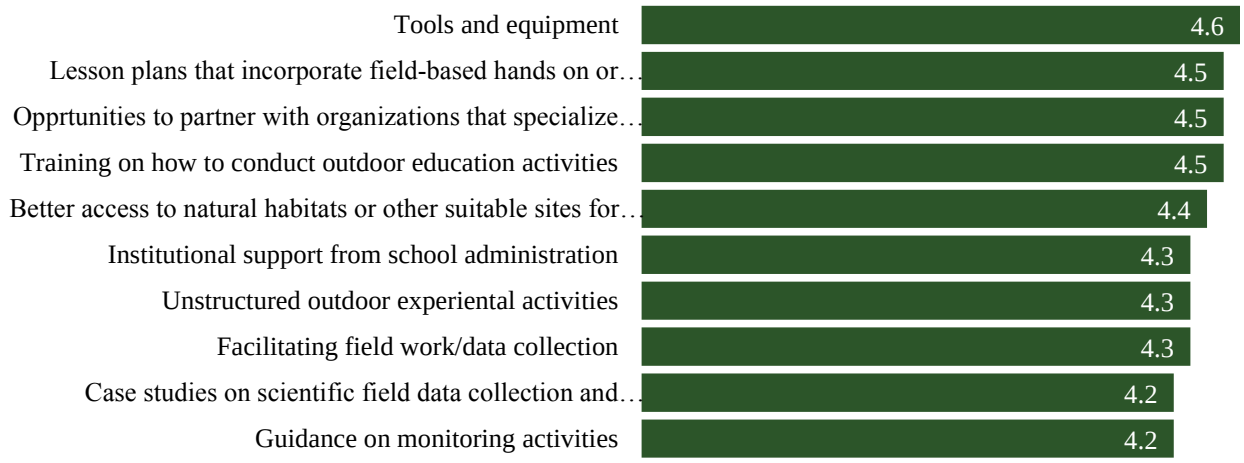


Average U.S. Teacher Ratings of Material Usefulness by School Level



Mexico teachers, on average, highly rated all materials as useful for incorporating outdoor education.

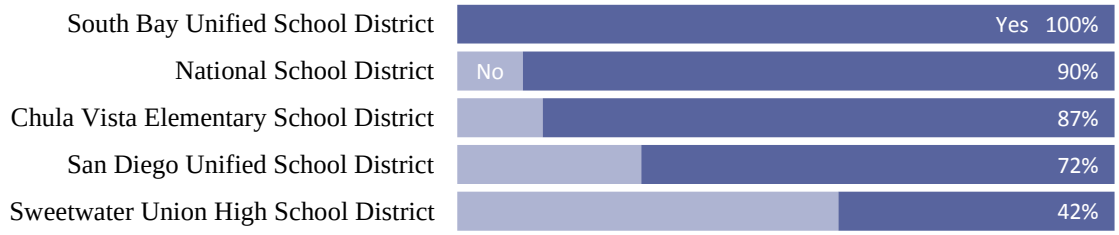
Average Mexico Teacher Ratings of Material Usefulness



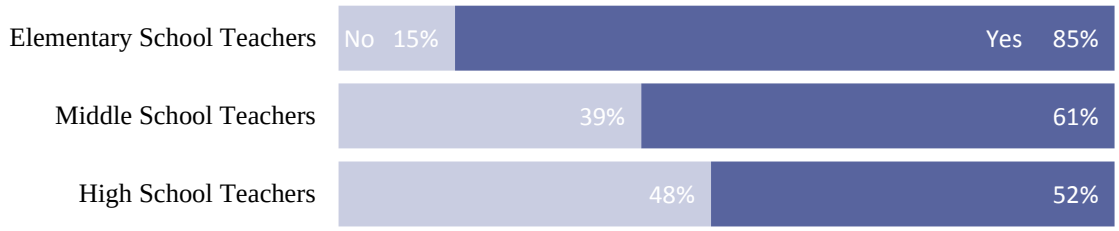
Question 22. Do you take your students on field trips as part of your science curriculum/activities?

The majority of teachers from four of five districts take their students on field trips as part of their science curriculum. Sweetwater Union High School District teachers, on the other hand, are less likely to take their students on field trips as part of their science curriculum. Moreover, 85% of elementary teachers are likely to take their students on field trips compared to 61% of middle school and 52% of high school teachers.

U. S. Teachers that Take their Students on Field Trips as Part of Science by District



U.S. Teachers that Take Students on Field Trips as Part of Science by School Level

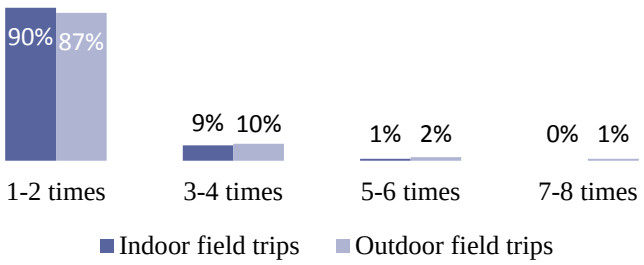


Mexico Teachers That Take Students on Field Trips as Part of Science

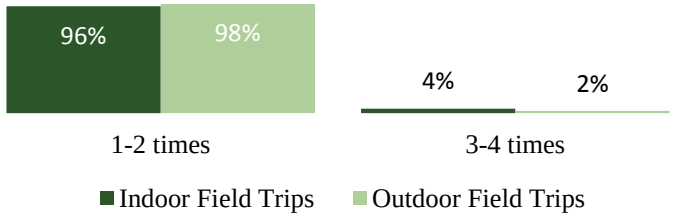
Question 23. How many times per year does your class participate in…?

Based on survey responses, the most common number of class field trips taken per year is 1–2 times. Indoor and outdoor field trips have the same amount of frequency.

U.S. Teachers Field Trip Frequency



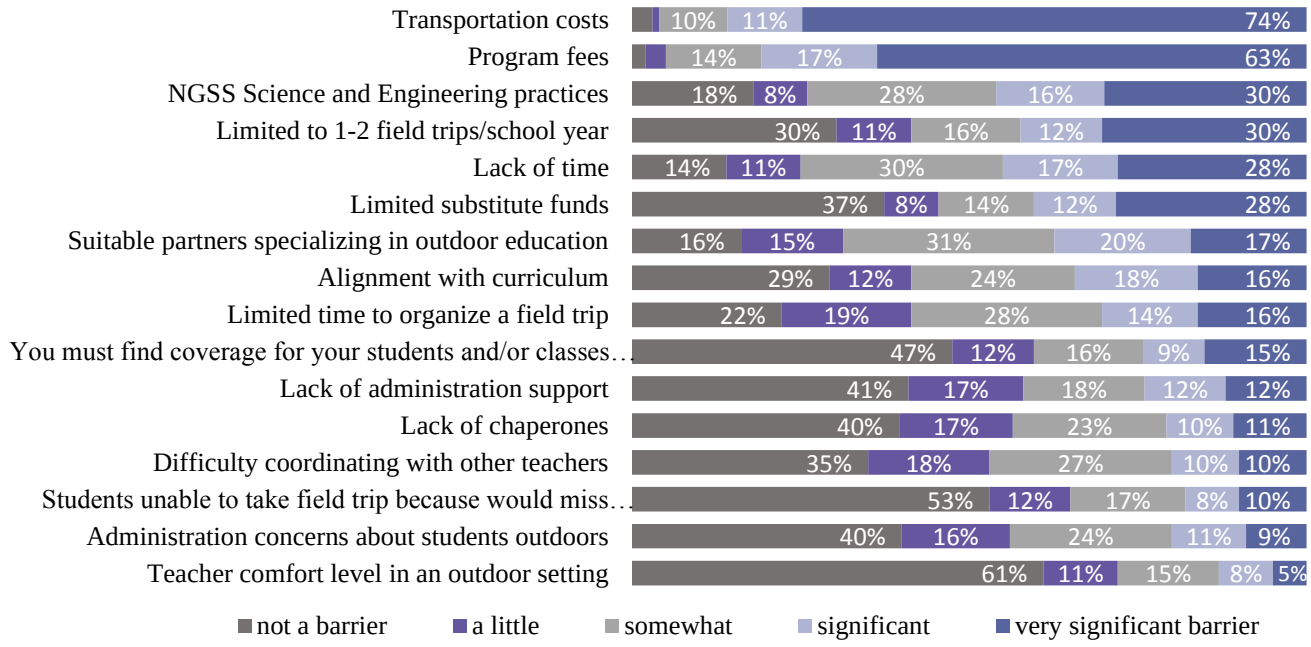
Mexico Teachers Field Trip Frequency



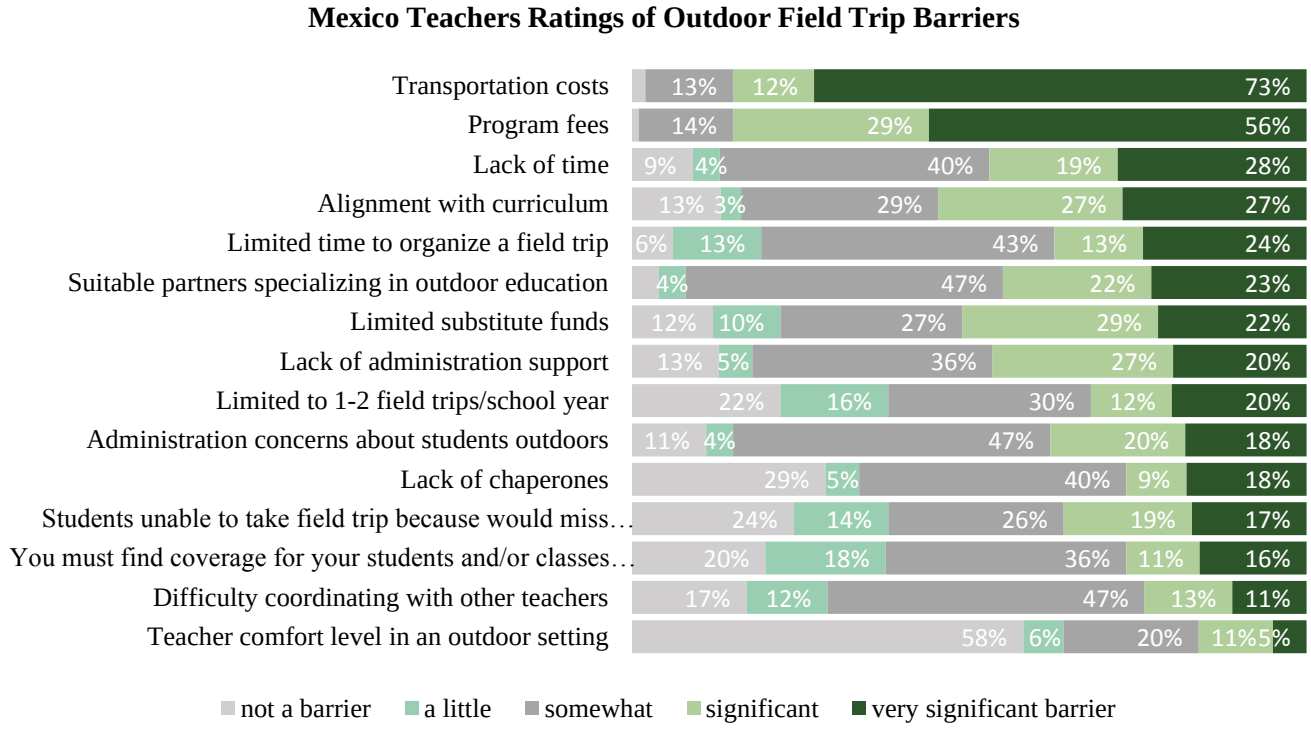
Question 24. To what extent do the following represent barriers to taking OUTDOOR field trips?

According to survey respondents, the most significant barrier to taking outdoor field trips is the transportation costs (74%) followed closely by program fees (63%). Teachers comfort level in outdoor settings and administration concerns about taking students outdoors are the least likely to be considered barriers to outdoor field trips.

U.S. Teachers Ratings of Outdoor Field Trip Barriers



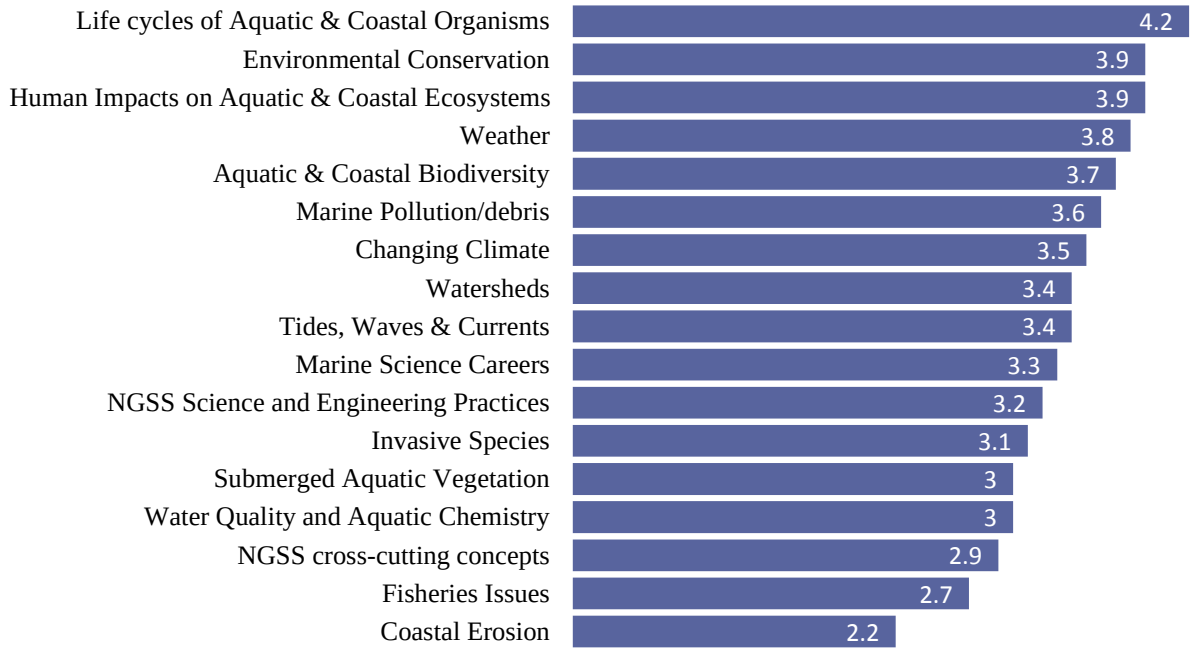
Transportation and Program fees are also the most significant barriers to taking outdoor field trips for teachers in Mexico.



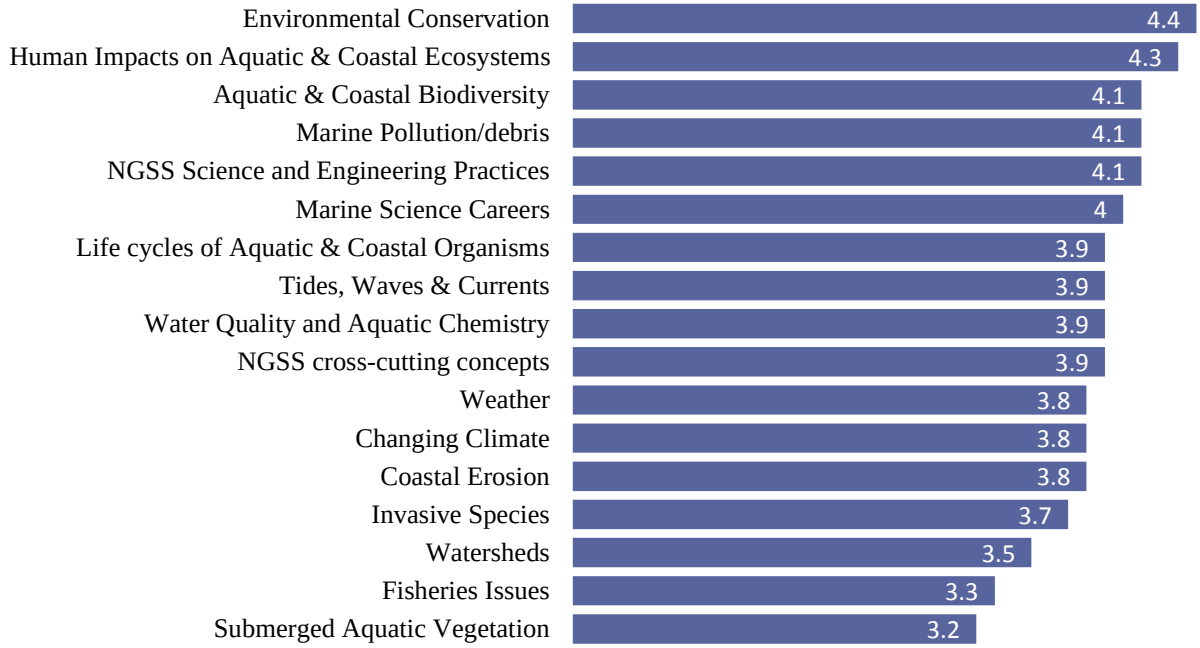
Question 25. Please describe your interest in FIELD TRIPS on the following topics.

Using a five-point scale with five being the highest (*i.e.* very interested) and one being the lowest (i.e. least interested), teachers were asked to rated their level of interest in different field trip topics. Results revealed that teachers responses varied by school level. On average, elementary, middle and high school teachers, however, rated "environmental conservation, "human impacts on aquatic & coastal ecosystems" and "aquatic & coastal biodiversity" in their top five topics that they would be interested in for field trips. The least desired topics are, on average, "coastal erosion" and "submerged aquatic vegetation." These are found in the bottom five topics for teachers from all school levels.

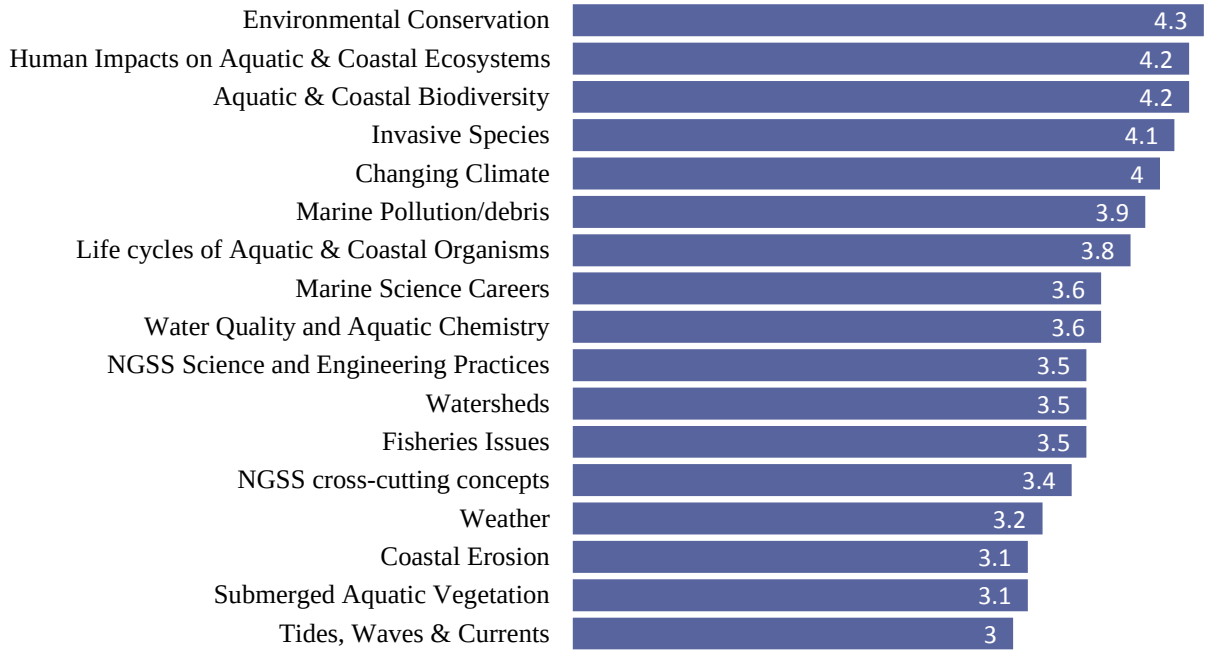
Average U.S. Elementary Teachers Interest in Field Trip



Average U.S. Middle School Teachers Interest in Field Trip

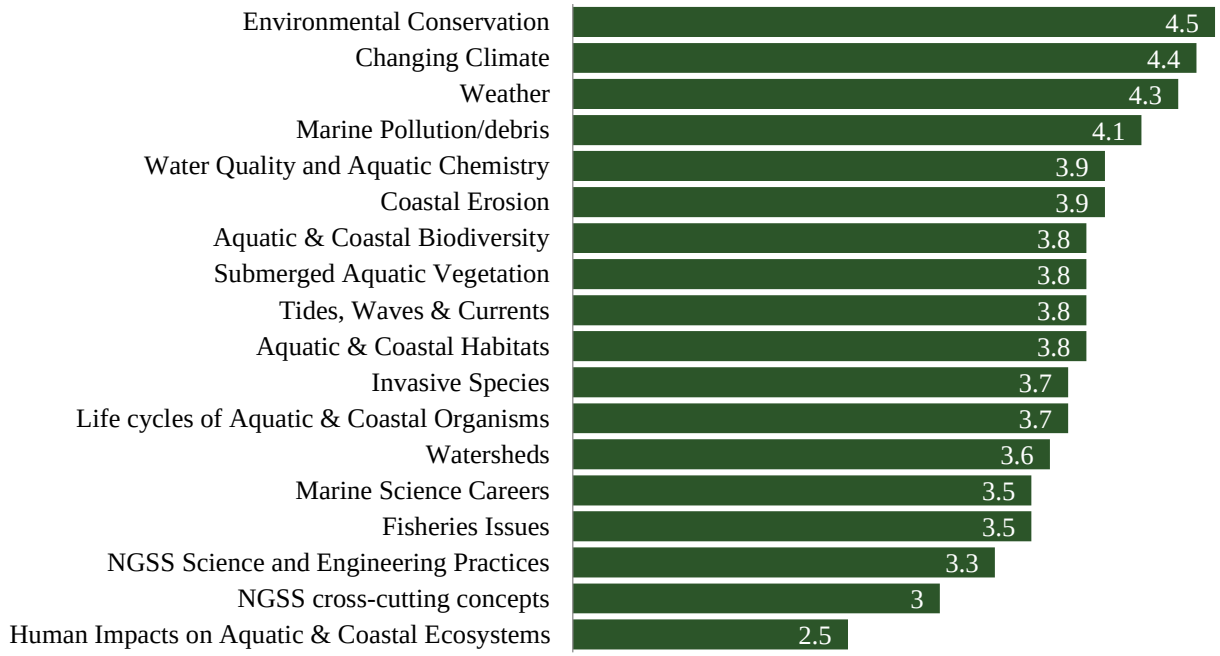


Average U.S. High School Teachers Interest in Field Trip



On average, Mexico teachers are most interested in field trips on "environmental conservation" followed closely by climate topics and water issues. On the other hand, Mexico teachers are least interested in attending a field trip on "human impact on aquatic and coastal ecosystems."

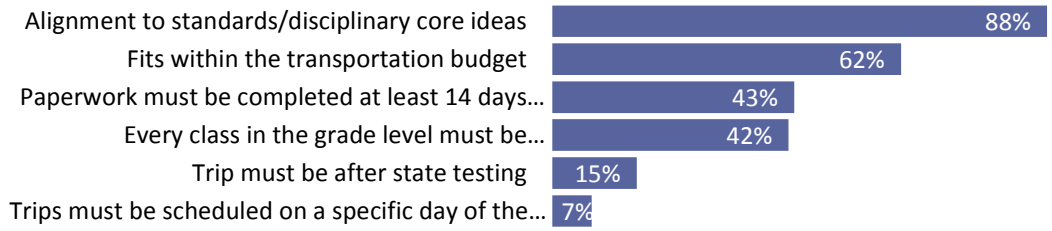
Average Mexico Teachers Interest in Field Trips



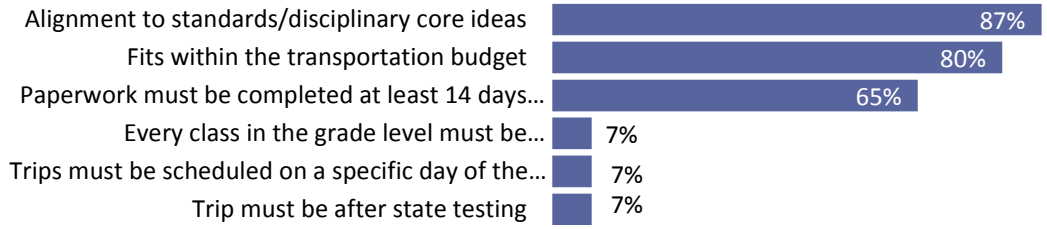
Question 26. What steps does your school site require in order to be approved to attend a field trip/study?

Although responses varied across districts, the majority of teachers, regardless of district they worked in, shared that "alignment to standards" and "fits within the transportation budget" are required steps to take a field trip. Moreover, the majority of teachers from all but Chula Vista School District shared that "paperwork must be completed 14 days prior to the field trip." The two least required steps as reported by teachers in all districts is that the "trip must be scheduled on a specific day of the week" and "trip must be after state testing."

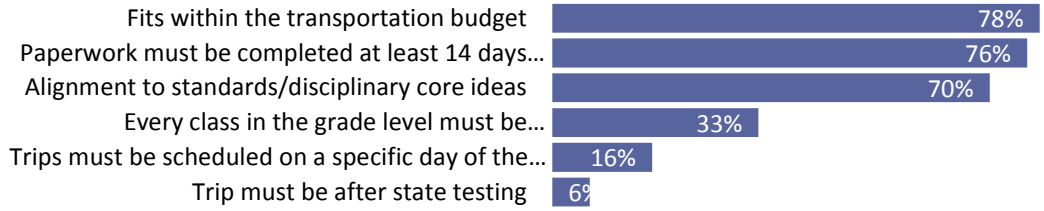
Required Field Trip Steps by Teacher Percentage for Chula Vista School District



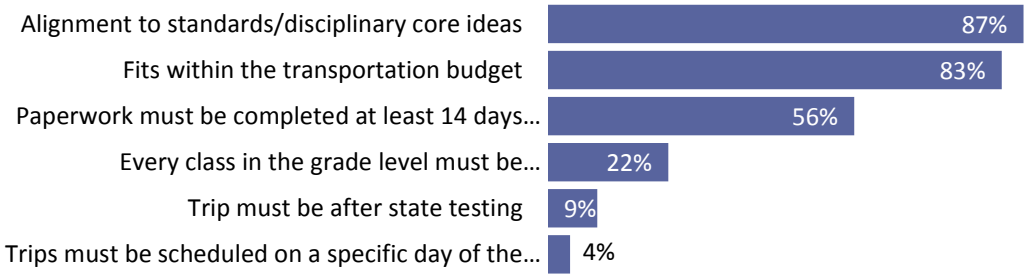
Required Field Trip Steps by Teacher Percentage for National School District



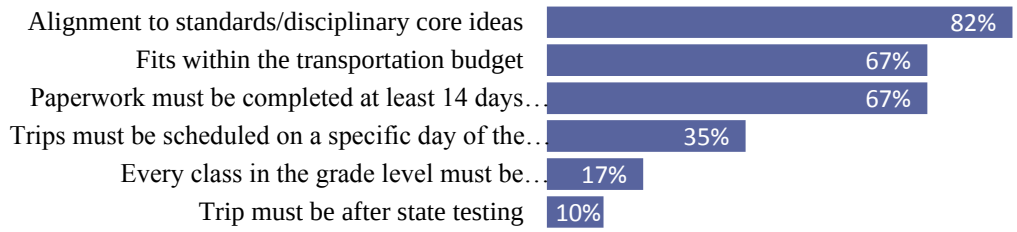
Required Field Trip Steps by Teacher Percentage for San Diego Unified School District



Required Field Trip Steps by Teacher Percentage for South Bay School District

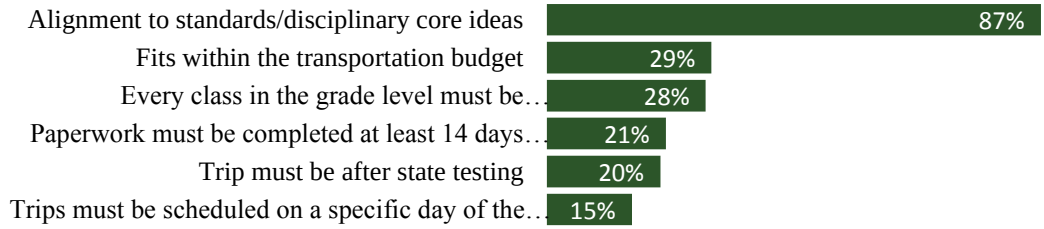


Required Field Trip Steps by Teacher Percentage for Sweetwater Union High School District



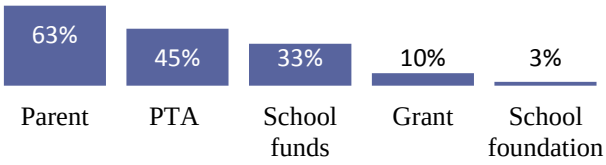
Like their U.S. counterparts, teachers in Mexico shared that the most required step for taking a field trip is that it be "aligned to standards." Less than one-third of all teachers shared that the other specified steps were required.

Required Field Trip Stepb by Teacher Percentage for the Mexico Teachers

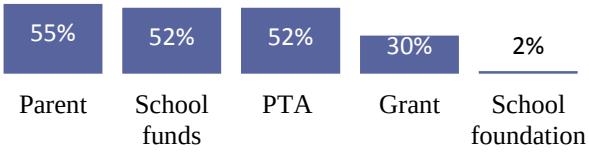


Question 27. How are field trips funded at your school?

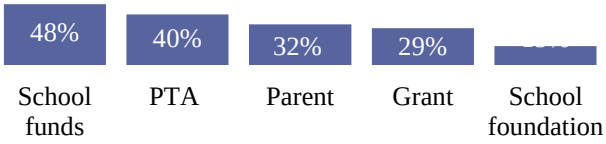
Field Trip Funding by Percentage of Teacher Responses for Chula Vista School District



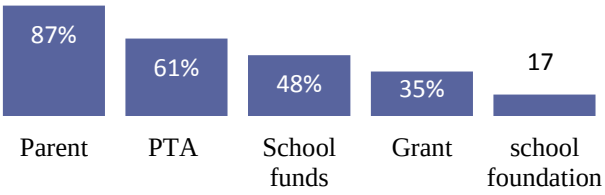
Field Trip Funding by Percentage of Teacher Response for National School District



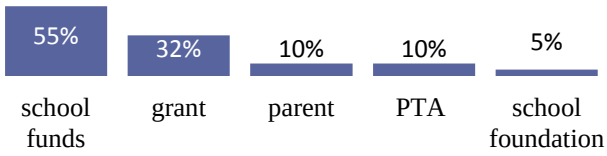
Field Trip Funding by Percentage of Teacher Responses for San Diego Unified School District



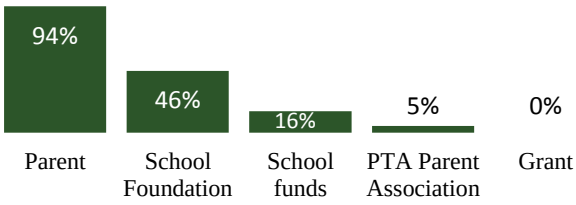
Field Trip Funding by Percentage of Teacher Responses for South Bay School District



Field Trip Funding by Percentage of Teacher Responses for Sweetwater Union High School District



Field Trip Funding by Percentage of Teacher Responses for Teachers in Mexico

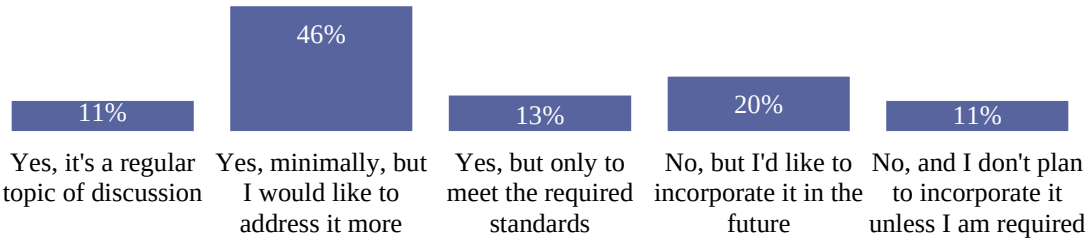


Question 28. Do you incorporate lessons or discussion related to climate change into your curriculum for the year?

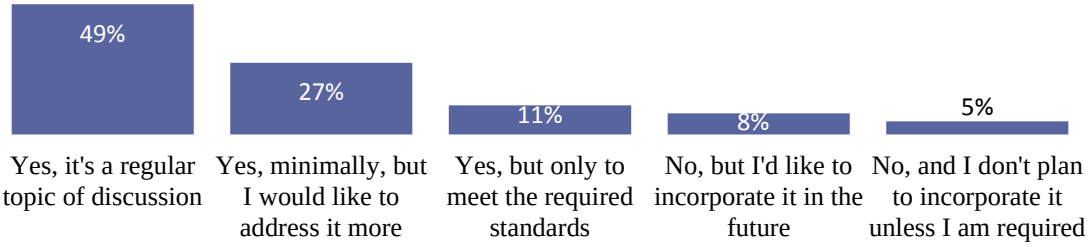
The majority of teachers from all school levels present a lesson on climate change. High school teachers present it the most followed by middle school teachers then elementary school teachers.

U.S. Elementary School Teachers Likihood to Present a Lesson on Climate Change

U.S. Middle School Teachers Likelihood to Present a Lesson on Climate Change



U.S. High School Teachers Likelihood to Present a Lesson on Climate Change

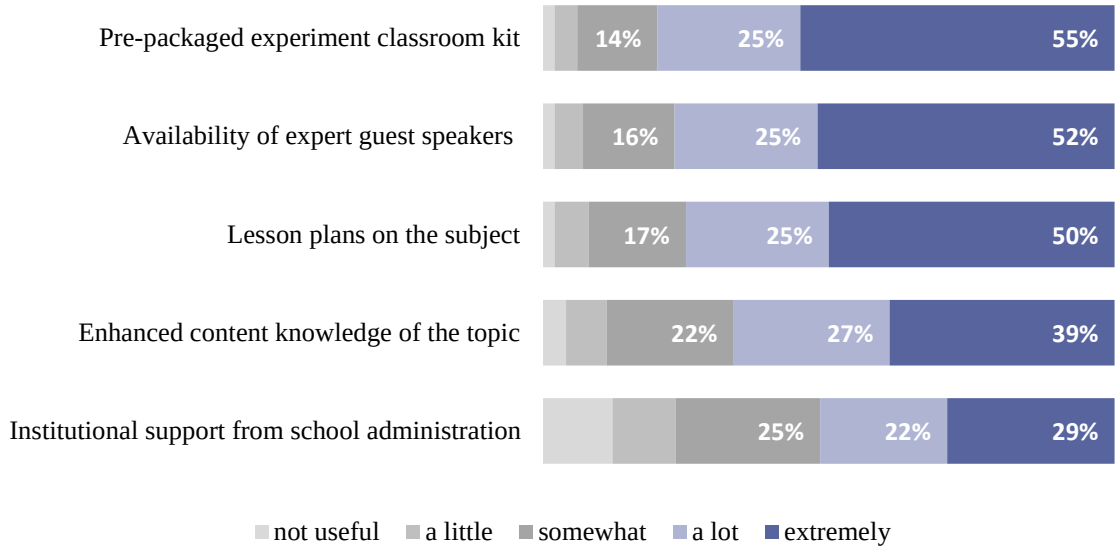


Mexico Teachers Likeihood to Present a Lesson on Climate Change

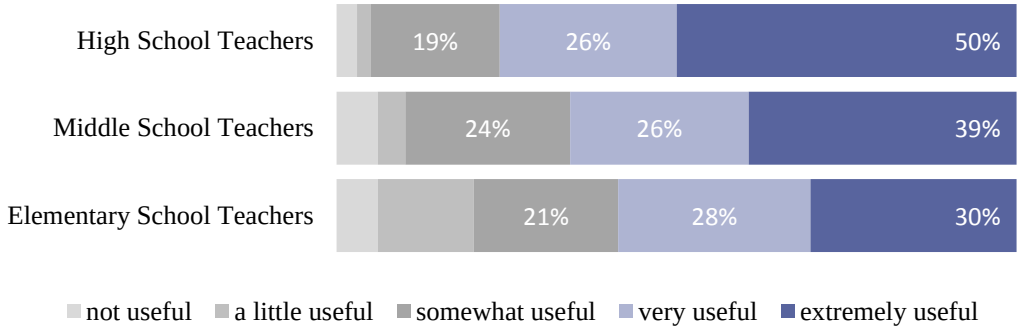
Question 29. To what extent would the following assist you in incorporating more discussion of the effects of climate change on coastal areas into your curriculum?

The majority of teachers shared that "pre-packaged experiment classroom kits," "availability of expert guest speakers" and "lesson plans on the subject" would be helpful in a discussion on the effects of climate change on coastal areas regardless of school level (80%, 77%, 75%, respectively). High school teachers were the most likely to want "case studies" to assist with discussions on climate change.

U.S. Teacher Ratings of Materials for Climate Change Lesson

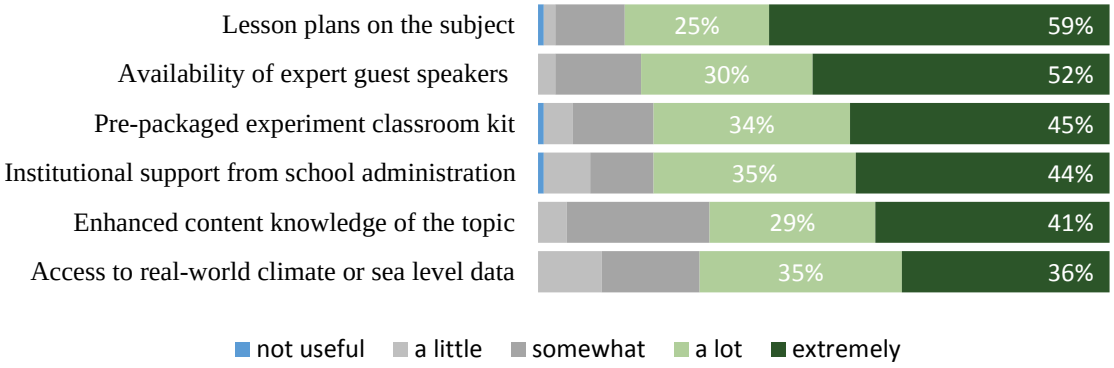


Usefulness of "Case Studies" for Climate Change Lesson by U.S. School Level



The majority of teachers from the Mexico sample are interested in materials that can be incorporated into a discussion on climate change. The most requested material is "lesson plans" followed closely by "guest speakers."

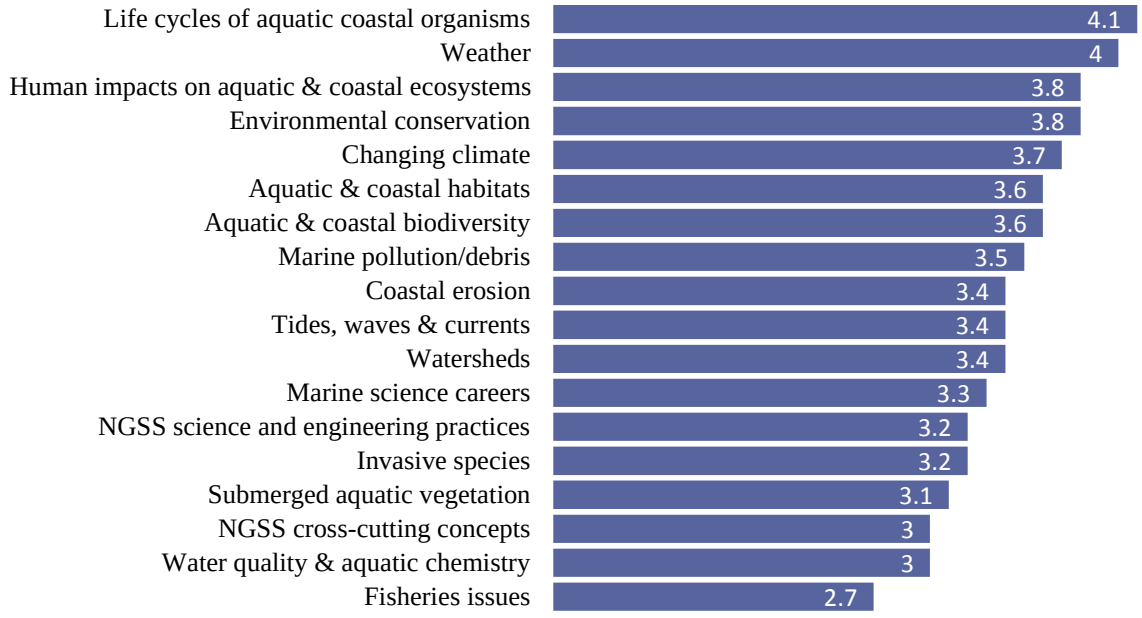
Mexico Teachers Ratings of Climate Change Lesson Materials



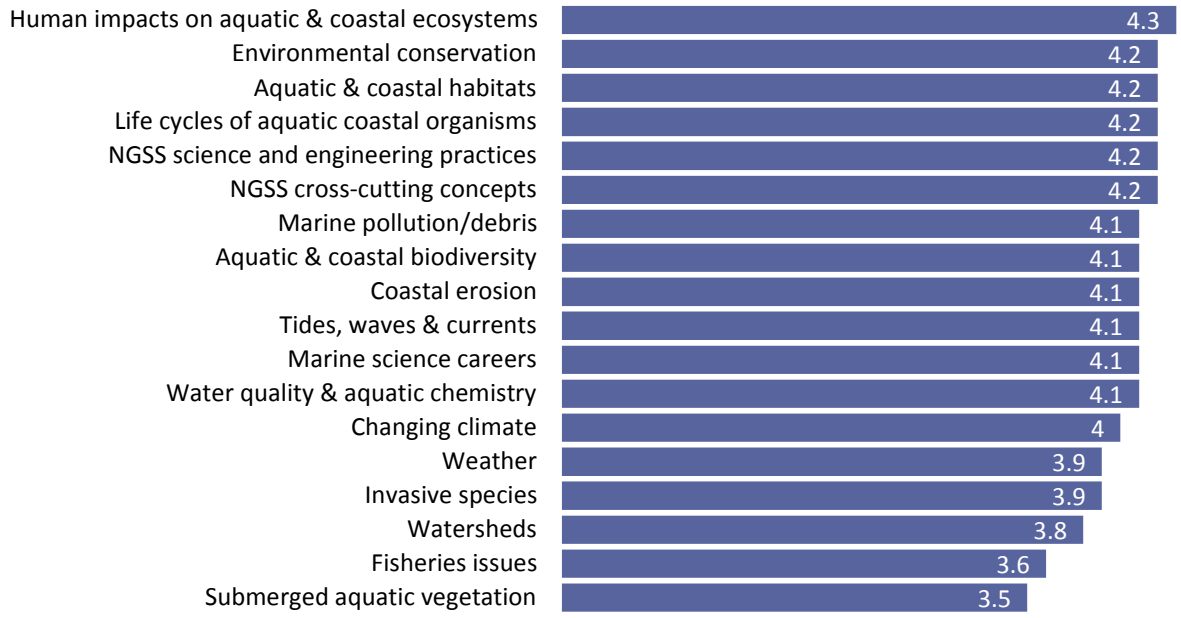
Question 30. Please describe your interest in seeing the following topics developed into EDUCATIONAL MATERIALS.

Teacher responses varied by school level; however, three topics, on average, received high ratings from all teachers regardless of school level. These topics are "human impacts on aquatic & coastal ecosystems", "lifecycles of aquatic coastal organisms" and "changing climate." Middle School teachers rated the most topics above a four suggesting that they are the most interested in having educational materials developed.

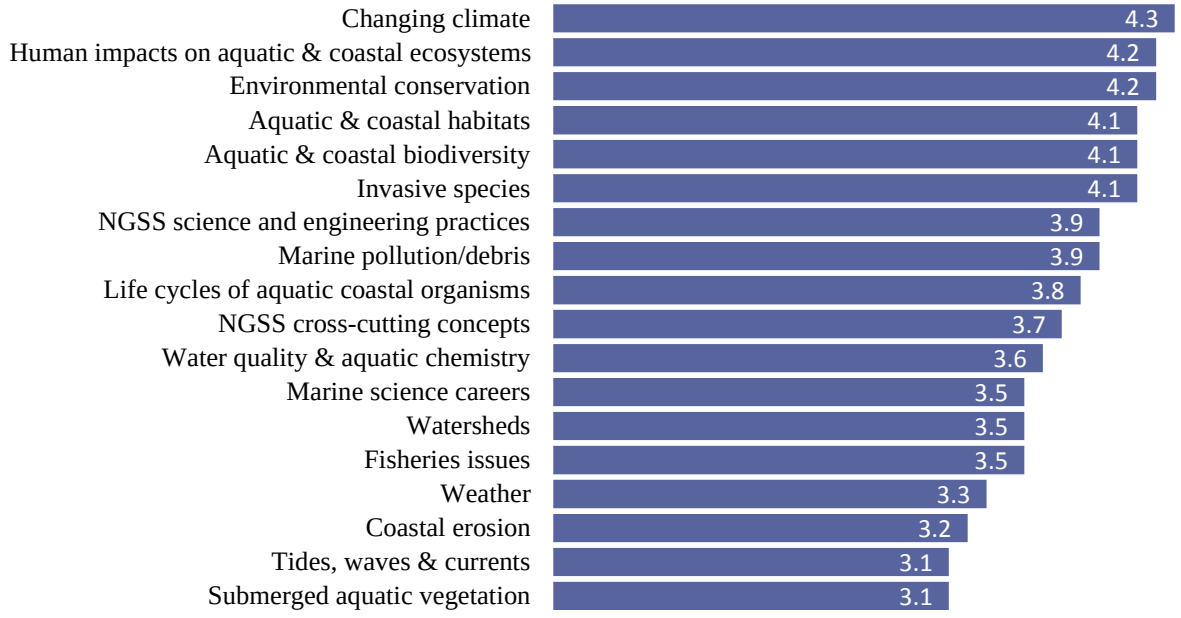
U.S. Elementary School Teachers Average Interest Ratings in Topics for Educational Materials



U.S Middle School Teachers Average Interest Ratings in Topics for Educational Materials



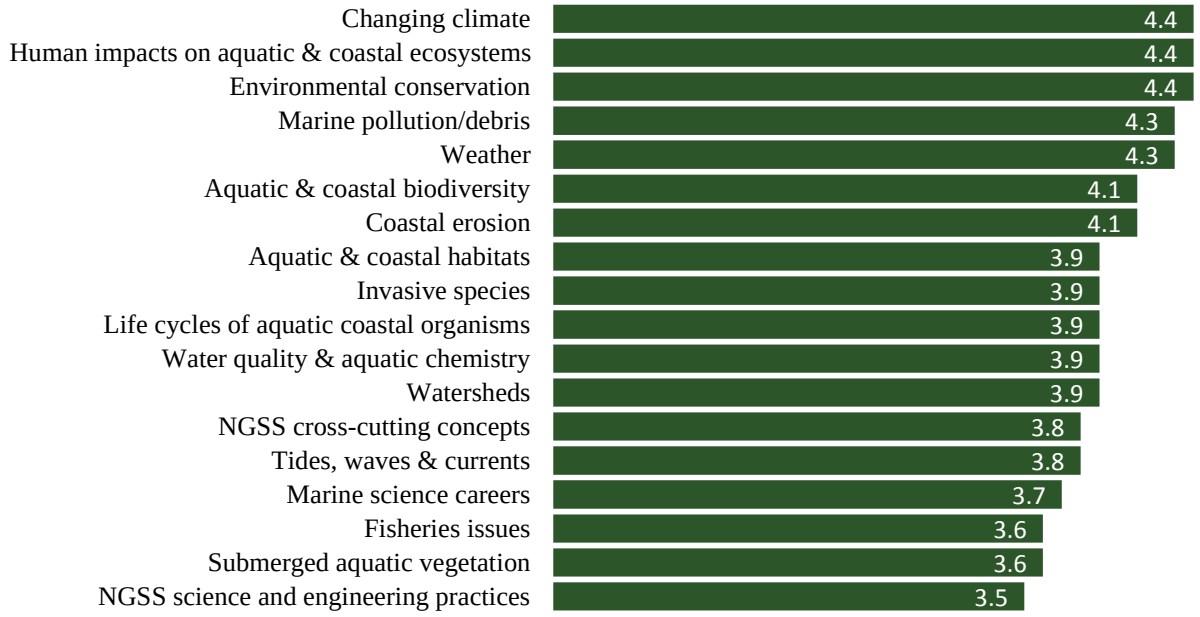
U.S. High School Teachers Average Interest Ratings in Topics for Educational Materials



Mexico teachers, too, are "a lot" to "extremely" interested in educational materials in the topics of "changing climate" and "human impacts on aquatic ecosystems." Moreover, there are several

other topics that teachers expressed a high level of interest in having developed into educational materials.

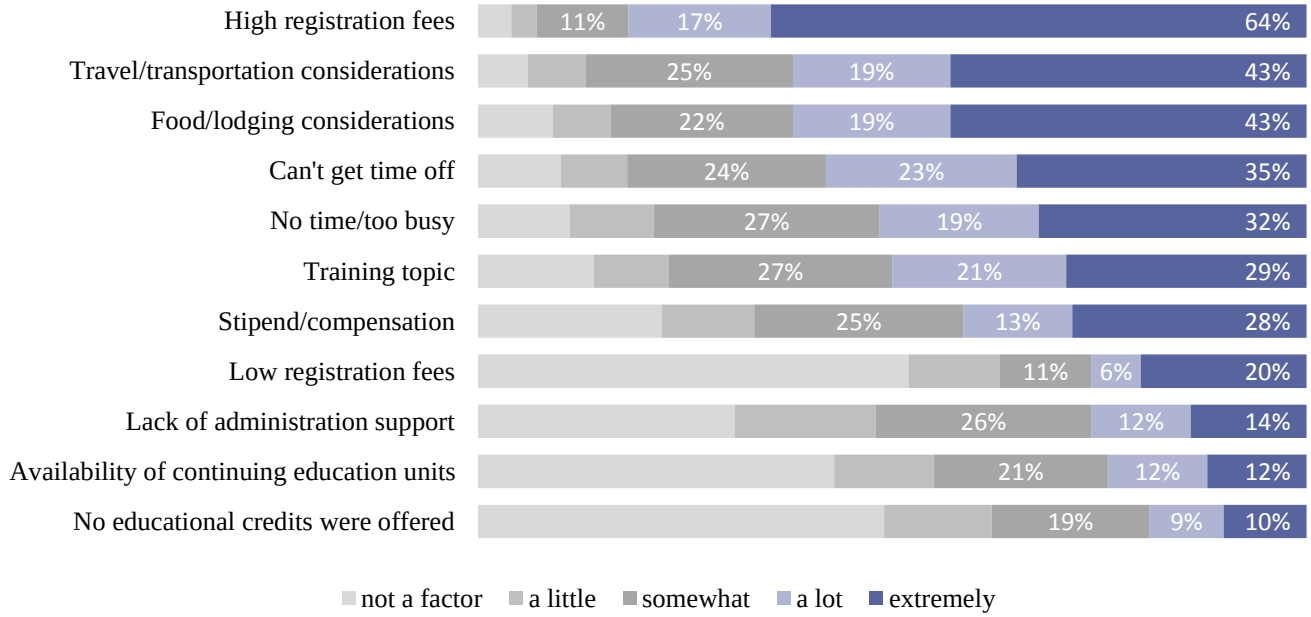
Mexico Teachers Average Interest Ratings in Topics for Educational Materials



Question 31. To what extent do the following factors influence your participation in professional development training?

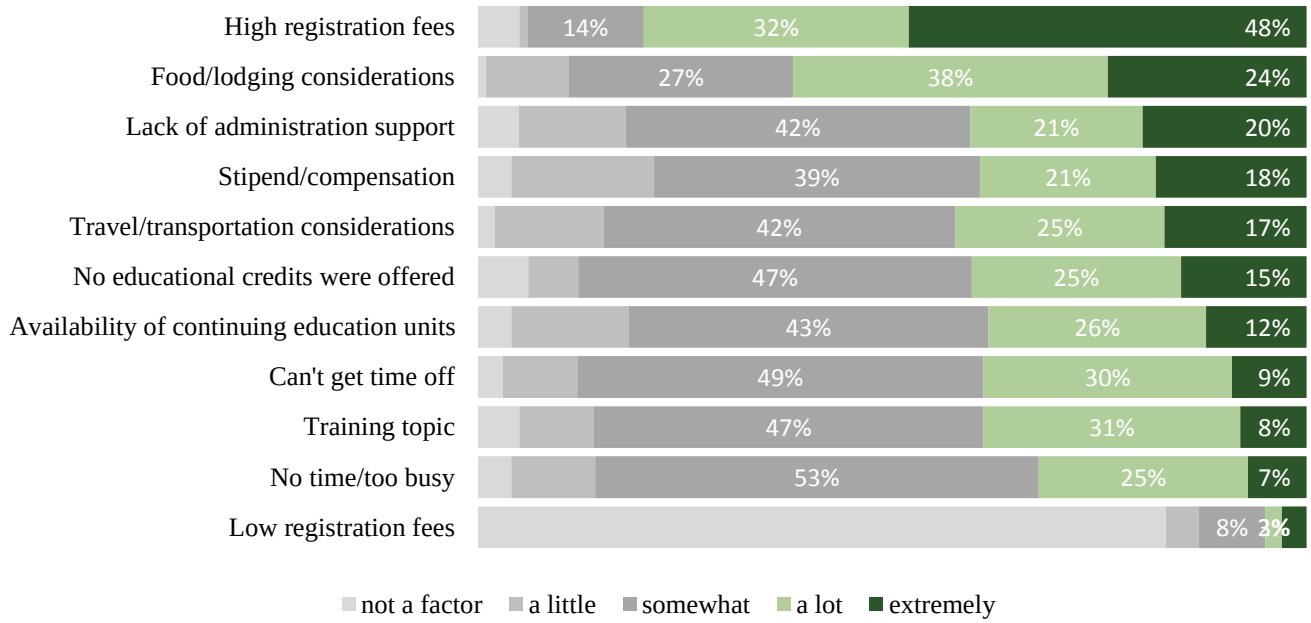
High registration fees are the most common deterrent to teachers' participation in professional development training regardless of school level or district. Interestingly, low registration fees are not considered an influential factor for participating in professional development training. Travel costs are also rated highly in whether one participates in professional development training followed closely by time issues (i.e. can't get time off & no time too busy).

U.S. Teachers Ratings of Factors that Influence Particiipation in Professional Development Training



Similar to U.S. teachers "high registration fees" is the top reason that influences participation at professional development opportunities. The cost of food and lodging is also a consideration

Mexico Teachers Ratings of Factors that Influence Participation in Professional Development Training



RECOMMENDATIONS

- Increase awareness of TRNERR in San Diego County, U.S. & Mexico. This includes general awareness of TRNERR along with awareness of the educational materials available through TRNERR and the offerings on the website and how it relates to the curriculum.

- Awareness does not equal TRNERR use. Point out all of the different ways that teachers can utilize TRNERR educational materials in the classroom as well as outside of the classroom. Highlight both the opportunities in and out of the classroom because teachers are limited in the amount of time they are able to offer field trips.

- Teachers are mostly teaching about oceans, followed by estuaries and watersheds. Teachers are, however, interested in providing lessons on all of these topics. Therefore, provide teachers with educational materials on these topics.

- Develop lessons on oceans, estuaries, and watersheds that can be taught in less than one class period. Additionally, include a multitude of suggestions for the teacher who has more time and interest in going deeper into the lesson.

- Offer educational materials in Spanish including all lessons as well as on the website.

- Teachers have not had recent professional development on oceans, estuaries and watersheds. If professional development is going to be offered make sure to have it affordable, in a manner that doesn't expect teachers to take time off from their teaching duties, is near to their school and of interest.

- U.S. teachers are much more interested in emphasizing the rigors of science skills. Therefore, consider including scientific inquiry skills, data collection and analysis into all educational materials including field trips, lessons and website offerings. In contrast, Mexico teachers are much more interested in outdoor experiential learning. Focus efforts with Mexico teachers on the outdoor experiential learning opportunities that TRNERR offers and highlight ways teachers can incorporate into daily lessons.

- High school teachers are much more interested in gaining access to real-time/ archival data sets. When increasing awareness of TRNERR and their services, make sure to focus on how TRNERR and NERRS can facilitate access to such data sets. Because atmospheric carbon dioxide and pH were the data sets that teachers were the most

interested in gaining access to, use these for examples of data sets available; however, point out that there may be other data sets available as well.

- For teachers in Mexico, however, access to a water contaminants data set would be welcomed by the majority of teachers. Consider showcasing access to this data set when presenting to teachers in Mexico as well translating this data set into Spanish.

- For both Mexico and U.S. teachers, provide explanations or lessons related to the use of particular data sets because the majority of teachers do not currently use data sets. The use of data sets may be one of the options to extend a lesson on oceans, estuaries and watersheds.

- Teachers are willing to take their students into the outdoors. They are most interested in structured activities that incorporate scientific skills. Incorporate ways to teach a lesson outdoors, on-site training on how to conduct outdoor education as well as tools needed to do science inquiry outdoors. It is also recommended that these on-site trainings, whether being modeled for teachers or in professional development training, incorporate science inquiry skills, data collection, and data analysis aspects to the lesson. Teachers from all districts and grade levels are interested in gaining this skill and knowledge.

- Teachers in Mexico are interested in gaining information and skills in all areas of outdoor learning.

- Teachers have little time for field trips. Consider providing transportation or at least pay for the cost of transportation of a field trip. Consider applying for grants that would cover the cost of transportation for field trips to TRNERR.

- TRNERR field trips should be tied to NGSS, incorporate science skills, include environmental conservation and/or aquatic organisms information for elementary students and aquatic ecosystems for middle school and high school students. All teachers are interested in a variety of topics. Consider asking teachers what standard they want the field trip to align to as well as what topic is of most interest. Information about climate change would be helpful as well.

- Mexico teachers, too, are interested in field trips that teach about environmental conservation. They are also highly interested in topics related to the weather. Consider offering a field trip in Spanish about the weather and how that connects to environmental conservation. Information about climate change would be helpful as well.

Appendix A

Teachers were asked what type of outdoor activities they took their students on. Responses are listed below.

Responses

Mar Vista High Beach, estuary, bay, water sampling

Reuben H. Fleet Science Center. Students were able to conduct hands-on experiment with rocks and powder. Also, students were able to collect samples and record and calculate data. This was more related with our Solar System Science Standards. 2. We visited Sea World. This addressed the Life Science (living things) standard. 3. In the past, we also had an assembly where the San Diego Water Department put on a performance to remind us of the water cycle and and how to conserve water. That was about it.

We observe our environment and collect plants and insects in our area when we study them. 2. We have visited the Chula Vista Nature Center in the past and have learned about the plants that tolerate salty water.

3 lagoon field trips per year Agua Hedionda

6th grade camp

6th grade camp

6th grade camp transpiration experiment cloud observations

6th grade camp at Cuyamaca Outdoor School Audubon birdwatching field trip Tijuana River Reserve Field trip On site birdwatching & observation

6th grade camp, school garden

Accessing storm drain and sources of pollution.

Activities at the program mentioned above.

Activities for plant life cycles, animal life cycles, and earth science (rocks and soil)

Activities realized within the school of various assignments and observations/annotations about the environment that surrounds the students' homes.

Air and Weather

Ambient temperature data, angle of incidence data for solar radiation, and night sky observations.

animal and plant observations/journals, soil sample collection and observation via microscope, shadow observation,

AP environmental science only soil analysis felid trip to estuary water testing

APES - various field studies (watershed, lagoon, estuary, tide pools, sandy beach community, Chaparral)

bacterial collection

beach clean-up and designing and testing water filters

Beach Teach- La Jolla

Because of no money. Field trips are a thing of the past as budgets are tight and I am not going to start a club just to sell candy! We did one local trip behind the school with a ROP class, that paid for my sub.

Bio Blitz in local Eco - Reserve.

Biodiversity

Botanical and entomological studies in the local preserve.
Camp experience
camping, kayaking
Canyon Exploration, tide pool trips
Catalina Island, Birch, Scripps, Sea World, Beach Clean ups
Children have to search for patterns found in nature.
Chula Vista Nature Center Olivewood Gardens Midway Torrey Pines State Park
Chula Vista Nature Center San Diego Zoo
Classification of organisms
Clean up of the Chollas Creek area
Cleaning the beach at the Nature Center.
cloud watching exploration of plants weather watch
Collecting animals for a Eco column, visiting a farm to research organic farming
collecting seeds and leaves growing a garden exploring at the park
Collection of rocks/leaves
Crustacean Lab
CV Nature Center; Otay Community Garden
Dealing with measurement of objects outside the classroom.
Drawing shadows. Planting garden
Earth science nature walks, and planting seeds. We track how much growth our aquarium plants grow, not sure if this counts.
Ecological assessments, urban ecosystem exploration, population surveys
ecosystems
Environmental Gardening Recycling Habitats
Examining trees around our school and studying in our school garden.
Experimentation.
Experiments
Experiments found in some materials.
Exploration of change.
Exploring bugs and insects. Field trips to the Discovery Center and Coronado.
Exploring local tide pools, Mission Trails Park, local beaches, field trip to Famosa Slough
Exploring on campus: types of soil, trees, living things
Exploring the natural environment
Exploring the nature of plants with an emphasis on trees.
Exploring the school campus
Field Activities (Field Trip to Estuary)
Field practices and observations of living beings in their community.
Field studies in Rose Canyon
Field trip to Cabrillo National Monument
Field Trip to LCDC
field trip to Living Coast Discovery Center
Field trip to local canyons to explore local coastal chaparral habitat and identify native plants.
Trips to zoo and museums to explore primate behavior and evolution.

field trip to nature center
Field trip to Sea World
Field trip to Stelzer Park, Nature hike to explore /identify trees
Field trip to the estuary and outdoor science program that came to our classroom for an afternoon.
Field trip to the Nature Center
Field Trip to the San Dieguito Lagoon.
Field trip to TRNERR
field trips
Field trips
Field trips
Field trips
field trips
Field trips Experiments
field trips to Chula Vista Nature Center, Tide pools, San Elijo Lagoon Conservancy, Mission Trails, Stelzer County Park, San Diego Water Reclamation Center
Field trips to Emory Cove and a local canyon
Field trips to LCDC and the Scripps Aquarium, school garden
Field Trips to local colleges, Pharmacy Day, EYH
field trips to local resources based on our science standards
Field trips to museum and Sea World.
field trips to places like the Living Coast Discovery Center
Field trips to San Diego zoo
Field trips to SD Bay and neighborhood canyons.
field trips to sea world and tide pooling
Field trips to the Living Coast Discovery Center
Field Trips to the Living Coast Discovery Center, Chula Vista, California
Field trips to the Tijuana Estuary and local tide pools
field trips to Torrey Pines State Preserve and Mission Trails Regional Park
field trips, 6th grade camp
Field trips, hands on activities, garden
Field trips, hands on activities, garden
Field Trips, Nature Journals
Field trips, outdoor campus explorations, neighborhood walks/explorations
Field trips, outdoor observational labs
Field trips, school walkabouts.
field trips, walks, conferences
Field trips.
Field trips-Torrey Pines State Reserve
Field walks on campus
Field walks, chaparral habitat studies, tadpole studies, beach sand surveys.
Field work activities such as sampling in a canyon.
Fieldtrip through Audubon Society

Floating lab, collecting rocks, sand
Foss module activities
Games, Experiments, Nature Studies
Garden
garden
garden activities
garden and field trips
Garden exploration and stewardship Field trip and research to Living Coast Discovery Center
Garden natural resources
Garden soil studies, lagoon water studies, insect habitat studies
garden, SD Zoo, Sea World
garden, wetlands, giant kelp, marine invertebrates, marine mammals, sea birds
gardening field trips to Steltzer Park
gardening and sun moon stars
gardening, art, some science
Gardening, life cycles of garden ""pests"", worm composting, SDCOE Splash Van
geocaching hiking open exploration in MTRP, Crest Canyon, Del Mar Beach, Border Field State Park, Florida Canyon, Switzer Canyon
Habitat Hero replanting at 13th street and Chula Vista Nature Center. Field trip to Tijuana Estuary, CV Nature Center, Reuben H Fleet Space Theater-Arctic; Zoo, Balboa Park Nature Walk
Hands-on, experimental, data-collection, observational
Hike at Mission Trails
Hike in canyon
Hiking in Rice Canyon with the Natural History Museum Canyoneers
Hunting for trees and leaves. Flying kites and dropping parachutes.
HW
I coach an after school science club and take at least 1 week end tour or trip every month
I have been retired 1 1/2 years from public schools, but volunteer at a private school now. I have not fully set up the estuary unit at that school yet. Answer 21 applies to the private school. All my other answers were from the public school system.
I take a field trip to the zoo for animal behavior.
I took a group to the San Elijo Lagoon and we learned about human impact, invasive species, stewardship, tides, birds and animals, etc.
Identification of migratory birds and coastal plants
In 1st grade a walk to learn about the natural components of our locality and in older grades, observation on the growth in certain plants, etc.
Independent experience credit for visits to local parks, museums, events, interviews with experts, etc.
Kids Eco Club Presentations, SDCOE= Green Machine, Splash Van, Recycling Troubadours, Enviro-Schools, Organic Gardening, Pond, Composting, Community Clean Ups, School Grounds Clean Ups, Recycling, Invasive Weed Removal, Planting Native Plants. Field trips: Torrey Pines, Zoo, Safari Park, Midway Ship Museum, Miramar Landfill, Water Purification Facility.

Lab activities using Rose Creek, Mission Bay, salt marsh
Lagoon field trip
Leaf searches/ collection, weather observations, shadow observations, rock searches/collection
Learning about their shadows
Living Coast Discovery Center
Living Coast discovery Center and Camp Cuyamaca
Living Coast Discovery Center, Ocean Connectors
local climate observation: rain gauge - measuring, & recording data, condensation experiments, creating water cycle projects . . . habitat study (bees) changing states of matter
Looking for erosion
looking for examples of erosion after rainfall.
Marine Floating Lab
Measuring and calculating areas, perimeters and ?
Midway museum
Mission Trails when studying local Native Americans.
Modeling activities; journaling
Morelos Park
Morelos Park
Morelos Park
Mostly activities from our FOSS kits and Ocean Discovery Institute
Mostly field trips- Living Coast Discovery Center and Cuyamaca College Water Conservation Garden
Mostly they have done observations in our school garden.
My students attend 6th grade camp and have the opportunity for outside learning.
Nature Center fieldtrips- Kumeyaay exploration; crustaceans hands on activities
Nature Center, gardening, weather observations
Nature Hikes I Love A Clean San Diego Activities/Presentations
nature scavenger hunts
Nature walk arounds
nature walks
Nature walks and National Park visits
Nature walks, field trips to Balboa Park, the Mineral and Gem Society,
nature/ camp
neighborhood and school grounds, science, leaves,
No funding
None
Not it watershed/estuaries/ocean activities. I do other outdoor activities that can be done on campus.
not related with the topic.
Not sure this is what you mean, but we do labs outdoors. We do the water bottle rocket lab, egg drop project, paper airplanes, collect data for calculating velocity, springs to represent waves and wave properties.
Observation and data collection

Observation journals for weather and plants.
observation of moon cycles, temperature of soil and water activity
Observation of plant and animal life in a garden. Observation of evidence of seasonal changes.
Observation of moon phases and movement patterns.
Observation of their geographic space and reforestation
Observation practices, projects where they have to directly go to the area.
Observation: nature, plants, leaves, discussion about trip to Suzie's Farm: vegetation
Observations of nature, experiments.
observations, field trips, experiments
Observe areas to see the types of living beings that inhabit it
observe outdoors
Observe the community and geographic spaces
Observing butterflies, collecting rocks and sticks to make insect habitats, writing about nature, reading
Observing our school environment (trees, rocks, air, and weather). SD Zoo fieldtrips
observing weather and clouds, studying wind and air with parachutes and kites outside
Observing weather patterns and earth materials found around our school.
Ocean connectors program
Ocean Discovery has come out to our school and done a workshop with the students and then we've worked in the canyon near our school to plant native plants.
ODI Fieldtrips - Wetlands/Emory Cove Canyon Restoration
Off Campus walks and hikes in our area. Also have participated in various clean-up activities
Olivewood Gardens Field Trips
On a few occasions according to what's in the material.
On campus, but not dealing with water.
Organic gardening, Aquaponics
our FLAGS program goes on a field survey of Rice Canyon park
Our school is across the street from a Wildlife Preserve. We take two trips, one to study plants, and another to study birds and aquatic animals.
Outdoor
Outdoor
Outdoor
Outdoor ed. Statistics using the natural world.
Outdoor educe. school
Outdoor experiences restricted to our school campus environment.
outdoor experiments and data collection
Outdoor labs.
outdoor observation on campus presentations
Outdoor School, Estuary Field Trips, Audubon Society Field Trips
outdoors
Outdoors
outside, off campus events, as well as virtual field trips, outdoor labs, and visiting scientists.
Paper Airplanes Bottle Rockets Speed and motion

Park and walking field trips nearby, looking at runoff during rain, trash accumulation...
Parks
Parque Morelos
PBL Water Project
pinniped study, tide pool explorations, beach-teach, wetland workshops, pond studies
Plant activities
Plant Diversity Scavenger Hunt- across the street at the community college arboretum. No costs are involved and I don't need a sub
planting a garden
Planting a garden. We also went to the Chula Vista Discovery Center.
Planting and growing seed.
Planting, animal observations
plants light
plants, gardening, water cycle, rock cycle, geology, compass and activities with EDI
Population estimation, Eco Bottles, Biodiversity study, stream bio assessment, planned trip to Channel Islands
Poway Kummeyyay Interpretive Center and Poway nature hike
Project Wild
researching local watersheds
Rock and soil hunting, gardening, composting
Rock gathering and identification. physics exploratory experiments.
school garden
School garden. Planted and cared for various vegetables.
School yard collecting
schoolyard activities, estuary field trip, outdoor labs, SDCOE outdoor education
Science related
search and observation
Shadow tracking over the year
simulations, in-class labs
sixth grade camp
Soil collection. Temperature recording. Weather tracking.
Soil porosity Leaf observation
Soil, experiments
Solar observations
Some garden activities, going to outdoor field trips.
Splash Lab, Tecolote Canyon Project, Riley's Farm Revolutionary Program, S.D. Maritime Pilot Boat, Midway Weather, Midway Social Studies, gathering plants to press and study, class dooryard colonial garden, Balboa Park)outside and inside Museums)
Sports
Students make a field guide. We do a distribution and abundance estimate at the school site.
Sun and moon investigations Weather observations and experiments
Sun, moon, and shadow observations.
Sweetwater authority

taking walks around the school to make some observations of weather, sounds, animal/insect homes
Tecolote canyon plant inventory, evidence of animal habitation
Tecolote Canyon, evidence of animal life, food webs, drought tolerant plants, non-native species
Testing of airplane design and of sun dials.
They see the environment and talk about what surrounds them
Third grade garden & study of sun, moon, shadows...
Through Ocean Discovery 4th grade goes on a field trip to a local canyon as well as a wetland.
Tide pool field trip School Garden Mission Trails hike and field trip 5 senses nature walks
tide pool organism identification local habitat ecology and organism identification
topography, canyon ecology
treasure hunt
trip to Birch Aquarium, I love a Clean SD comes to my class to present on watersheds, trip to mission trails, in the process of obtaining funds for trip to estuary.
Trip to Estuary, work in school garden, trip to Water Conservation Garden
Trips to our salt marsh for science and math activities as well as water monitoring
Two hikes a year to wildlife preserve - across the street.
Urban forestry lessons on school grounds and in the neighborhood and Marian Bear canyon field trips
using mission bay and rose creek as outdoor labs, UCSD salt marsh
Using school garden for plant cycle and teaching inquiry science and outdoor activities related to patterns in weather and temperature and wind
USS Midway Field trip on weather
Visit to Living Coast Discovery Center
Visit to Parque Morelos
Visit to Parque Morelos
Visit to Parque Morelos
Visit to the Sweetwater Authority and 2 presentation about the watershed.
Visit to the Tijuana Estuary Visitor Center
Visited the Ocean, Mission Trails park and other water resources on line.
Visits to our local canyon
visits to San Elijo Lagoon visits to Torrey Pines State Reserve
Visits to the Living Coast Discovery Center
Walk the Watershed"" in which students explored Florida Canyon.
walks to note use of earth materials in the environment
Water testing
We go out to observe weather, clouds, and to look at drains that water goes down when running off.
We have a creek behind our school. We are also going to the Living Coast Discovery in February.
We have done outside collection of organisms to observe animal behavior. Students collect isopods, they must predict where they would be found In an introduction to plant biology students walk the campus and make observations about different types of plants (angiosperms,

conifers, etc.,) We made it to the estuary this year and got to collect data at the Estuary on plankton, water quality, and plant life.
We have gone to the Living Coast Center where students got the chance to collect water samples, looked at water clarity, and examined microorganisms that were collected.
We have hiked Torrey Pines and recorded observations. We have observed and taken measurements of a school garden.
We have looked at the earth materials in our school.
We planted a garden and are watching it grow. We have gone outside to look at the different trees for our science unit.
We studied air and its properties-- such as its effect on parachutes, bubbles, weather We also grow various plants to study the requirements for them to survive and thrive
We try to provide outdoor classroom activities as much as we can from walking outside the classroom for observations to field trips.
Weather and air related observations
weather and clouds School Garden
weather exploration... looking at insects... going to mission trails to look at a habitat
Weather observation and plant observations
Weather related activities
Weather, animal habitats, needs
Weathering and erosion walks around campus and home, geology walk field trip to La Jolla Shores, 6th grade camp, solar oven inquiry lab,
Weathering Walk, garden next to classroom
We'll walk around our school searching for evidence of seasonal changes, to collect leaves, pine cones and observe birds etc.
Went to the Tecolote reserve for a day.
what flora and fauna exist in their community
wild animal park study
Work in field investigation, field trips in the environment, guided trips, etc.
Working in the school garden
World Water Monitoring Day, estuary species assessment, tide pooling assessment,
Would like more- mostly environmental stewardship activities (service-learning)
Wright's Field
Years ago, when there was more of an emphasis on environmental standards, I took my students to the Famosa Slough. It was a great experience for all.
Zoo, mission trails park